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ABSTRACT

A research project evaluated the contribution of biological, behavioral, and social sciences to nursing and midwifery education programs in Britain. The study of scientific knowledge relevant to recently qualified nurses and midwives was confined to six topics: fluids, electrolytes, and renal systems; nutrition; acute pain; shock; stress; and self-esteem. The study first addressed the literature on the nature of professional knowledge. Four main strategies were used in interviews to elicit information about the use of scientific knowledge in practice: recent cases, orientation of new staff to a clinical area, learning required of a student, and concept mapping. To ascertain how scientific knowledge was used by experienced practitioners, researchers took advantage of the matrix format of the knowledge maps by combining the answers to two questions, one with a knowledge focus and one with a practice focus. Findings indicated that assumptions made in nursing education programs about learning and learning support in service settings tended to be overoptimistic. Analysis of case studies suggested that the psychological imperative for students to become accepted into service settings could not be ignored. A large number of practical mediation strategies had been developed in education settings on a piecemeal basis by individual lecturers, but there was too little mediation and individual sessions were attempting to achieve more than was feasible. (Appendixes include a summary of research methods. Contains 36 references.) (YLB)

ED 390 992

RESEARCHING PROFESSIONAL EDUCATION

Learning to Use Scientific Knowledge in Education and Practice Settings: an evaluation of the contribution of the biological behavioural and social sciences to pre-registration nursing and midwifery programmes

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A series from the English National Board for Nursing, Midwifery and Health Visiting

Learning to Use Scientific Knowledge in Education and Practice Settings: an evaluation of the contribution of the biological behavioural and social sciences to pre-registration nursing and midwifery programmes

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London, 1995

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Learning to Use Scientific Knowledge in Education and Practice Settings: an evaluation of the contribution of the biological behavioural and social sciences to pre-registration nursing and midwifery programmes

In 1993, the English National Board for Nursing Midwifery and Health Visiting (the Board) commissioned this research into the depth and breadth of scientific knowledge taught on pre-registration nursing and midwifery programmes of education. The research investigated a number of areas:

- How scientific knowledge is used by experienced practitioners.
- The selection of scientific knowledge to be taught on the pre-registration programmes, and its linkage to practice.
- Approaches to mediating scientific knowledge ad learning to use it in practice.

The findings of the research have important implications for providers of pre-registration nursing and midwifery programmes, and for providers of clinical placements for students on these programmes. These implications affect curriculum design, teaching and assessment of pre-registration programmes, and the professional development of lecturers in nursing and midwifery, and that of mentors on clinical placements. There are also implications for clinical audit and research into clinical practice. The detailed recommendations, all of which have been accepted by the Board, are given in Chapter 5.

The Authors

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Ann Wraight spent nine years in clinical practice both in the UK and in East Africa. She then qualified as a midwife teacher and taught for five years. Using her experience both in practice and education, she moved into a management post, which she held for the next four years. Since then she has worked in midwifery research. She has coordinated three large national surveys – *Pain Relief in Labour* and *Home Births*, both funded by the National Birthday Trust, and *Mapping Team Midwifery*, funded by the Department of Health – and two small studies for the Royal College of Midwives and a district health authority.

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Our steering group provided considerable support for the project, throughout its lifetime, assisting with strategic decisions, advising on presentation, criticising drafts and encouraging the research team with their interest.

Liz Williams carried out the difficult task of word processing the final report, and finding presentation formats to suit the rather complex demands of knowledge maps and case study data.

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Foreword

The English National Board is delighted to publish this report as part of its series: *'Researching Professional Education'.*

The aim of this series is to make the results and implications of research commissioned by the Board readily available to the key stakeholders: to policy makers, managers, practitioners, researchers and educationalists. The Board recognises that it is important for these groups to have ready access to relevant research findings from which to plan and implement developments in nursing, midwifery and health visiting education.

The Board's research and development programme is planned to ensure that education for practice is relevant both professionally and academically. Research-based evidence therefore provides an important dimension for policy development.

This report has been accepted by the Board and the research has important implications for programme providers and for providers of clinical placements. These implications affect curriculum design, teaching and assessment of pre-registration programmes, the professional development of lecturers in nursing and midwifery, and that of mentors on clinical placements. There are also implications for clinical audit and research into clinical practice.

The Board hopes that programme and service providers, practitioners, researchers and policy makers will work together to address the important findings in this report.

Maureen Theobald

Maureen Theobald

Chair, English National Board

Jeff Thompson

Professor Jeff Thompson

Chair, Research and Development Group, English National Board

London, 1995

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CHAPTER 1 INTRODUCTION

1.1 The project brief

The Board has recognised the need for guidelines on the depth and breadth of knowledge of the biological, behavioural and social sciences to be taught in pre-registration programmes for midwives and nurses. Such guidelines should ensure the relevance of curricular content to the outcomes required for initial registration. This recognition was prompted by a number of concerns:

- to sustain the higher academic standard expected of new education programmes leading to registration as nurses or midwives
- to ensure that the greater scientific content was directed towards knowledge needed in practice
- to avoid an over-emphasis on the social sciences at the expense of the biological and behavioural sciences both in teaching time and in specialisms developed by teachers.

Practitioners should use all relevant knowledge from the biological, behavioural and social sciences; Project 2000 (UKCC, 1986) was intended to facilitate this goal, but there is no general agreement about what constitutes the scientific knowledge base of nursing and midwifery, or how much should be taught in pre-registration programmes.

The Board decided to sponsor a research project to evaluate the contribution of biological, behavioural and social sciences to pre-registration nursing and midwifery education programmes, and accepted a tender from the University of Sussex in collaboration with the Sussex and Kent Institute and the University of Brighton. The research took place between June 1993 and November 1994.

Throughout this report the term **scientific knowledge** is used to cover knowledge within the biological, behavioural and social sciences. While important to practice, scientific knowledge alone does not constitute most of the professional knowledge base; this is **scientific knowledge embedded in professional practice**. The project specification suggested that the use of scientific knowledge in professional practice might not be helped by moving pre-registration programmes into higher education if that led to science being taught by lecturers unfamiliar with its use by practitioners. This problem has been recognised for some time; for example Boylan (1974) advocated:

> *'teaching a broad framework of physiology, psychology and sociology, the accent within these areas being on understanding and how knowledge can be used, rather than an acquisition of facts and how to put them on a piece of paper' (p.1781).*

Powell (1989) reported a study of reflective practice among registered nurses undertaking a diploma, in which:

> *'The most notable deficiency in the knowledge base was in the area of biological science, where the level of knowledge seemed excellent, but the nursing application of this was absent' (p.830).*

Neyle and West (1991) combine knowledge selection and knowledge use issues, arguing:

> *'The challenge to nursing is to borrow only those aspects of the traditional sciences which can be identified as having relevance to the practice of nursing, and to teach science . . . in a manner which ensures the transfer of scientific principles to the actual care of clients' (p.269).*

Any evaluation of the contribution of scientific knowledge to pre-registration programmes must consider not only **what knowledge** is or should be taught, but **how** it is taught and **whether students learn to use it in their professional practice**. The project needed to develop criteria by which the appropriateness of new curricula might be judged, and the consequent implications for staffing clarified.

1.2 Confusions and clarifications about theory and practice

Differences between the knowledge which schools of nursing and/or midwifery aspire to teach and what is used in practice by their students are often referred to as the 'theory-practice gap'. This phrase confuses a number of distinct issues; in practice, it may convey any of the following meanings:

(i) There are differences between the kind of practice advocated in education settings and that observed in service settings. This is more appropriately described as a gap between 'idealised practice' and practice considered acceptable in most service settings; it can be accounted for by practitioners' unwillingness or unpreparedness to attempt 'ideal' practice or by the impracticability of the 'ideal' in service settings. Assertions of impracticability can themselves be interpreted as genuine or as defence mechanisms.

(ii) The variety of practice settings makes it necessary for teachers to describe practice in generic terms, giving sets of practical principles rather than detailed blueprints for specific situations. Applying general principles in practice is rarely straightforward because an interpretation is usually needed of what they imply for any particular situation; there may be conflicts with other principles, or practical constraints imposed by the setting or students' limited practical skills. This kind of theory-practice gap is central to students' daily practice. The relevance of the principles may not be disputed, but learning to implement them can be difficult, and students may receive insufficient practical support.

(iii) 'Theory' may refer not to practical principles used to describe practice in a more generic way, but to that body of knowledge specifically referred to as **nursing theory,** which is considerably more abstract. Student nurses' practical experience begins with being told what to do, and they acquire credibility through doing what they see others do: working it out for themselves is an attractive pursuit for those with the time and inclination, but they will not be able to do that for real until they have acquired some experience and seniority, so theory is regarded as knowledge they cannot use, not necessarily irrelevant to practice, but irrelevant to current practice. Theory can be used to evaluate current practice, but is best done in the safety of an essay, rather than risk upsetting qualified staff in their placements.

(iv) 'Theory' can also refer primarily to knowledge derived from the scientific disciplines, especially to textbook representations of that knowledge. Sceptical practitioners tend to define as 'theory' any knowledge they regard as irrelevant, and to regard knowledge they use as part of 'common practice'. Thus the theory-practice gap is a direct consequence of the defined irrelevance of theory. The remedy is to cut out most of the theory.

(v) A constructivist view of theory may describe the gap in terms of public and private theory, arguing that we all use theories to organise our experience. Such theories may vary from near replicas of published theories, through personalised versions of these to theories derived from only personal experience. Private theories may be implicit in our thoughts and actions without being readily retrievable for critical evaluation. These ways of construing and thinking about the world have been called 'schemes of experience' (Schutz, 1967), 'personal constructs' (Kelly, 1955) and 'schemas' by cognitive psychologists. Terms such as 'lay theories' or 'health beliefs' are commonly used by health care researchers. To claim there is a theory-practice gap, therefore, is implicitly to state that the theories being advocated are not **our own** theories, those embedded in our own practice.

(vi) Another form of 'theory-theory' gap has been noted by Argyris and Schön (1974) who distinguish between people's espoused theories – those they claim to use, and their theories in use – those embedded in their practice, of which they may not always be fully aware. It is not unusual for theories taught in professional education to provide espoused theories which match professionals' ideals and provide convincing justifications of their work, but rarely get used in practice. This develops a kind of bilingualism in which aspiring professionals learn one kind of discourse for discussing and justifying their practice using ideal principles while using a different discourse in practice itself (Melia, 1987).

The issues raised in (i), (ii), (iv) and (v) above are relevant to the investigation of the use of scientific knowledge in nursing and midwifery, all six meanings are relevant to the practice of nurse and midwifery education.

1.3 Focusing the research and formulating its main objectives

The central problem for the project was to ascertain how students learn to use important scientific knowledge in professional practice. This requires significantly more time than learning to reproduce it in examinations, so there is competition between the amount of scientific knowledge which can be taught and whether students get sufficient time and support to learn to use it in practice. Conducting an opinion survey which concluded that more scientific knowledge ought to be taught on pre-registration programmes might have provided useful guidance for the design of programmes and helped to curb overly idiosyncratic selections of scientific knowledge, but would only exacerbate the problem of teaching students scientific knowledge they never learn how to use.

Allocation of time is crucial in the design of pre-registration programmes; higher education has developed norms for allocating time for teaching scientific knowledge, but not in the context of professional education with its concern for the application of scientific knowledge in practice. Following higher education norms, therefore, will almost certainly result in teaching more scientific knowledge than students can learn to use in the time available, setting up a cycle whereby unused knowledge is dismissed as 'irrelevant'. This then affects the reputation of the programme of education and of scientific knowledge in general, making it unlikely that practitioners will be motivated towards acquiring further scientific knowledge in continuing professional development. Mentors and preceptors will then give it little priority, reinforcing students' beliefs that much of what they are taught is irrelevant.

In contrast, giving priority to knowledge use could set up a different cycle, with newly qualified practitioners thinking there is yet more 'relevant' scientific knowledge to be gained through continuing professional development. It is counterproductive to cram all potentially relevant theory into initial qualifications, neglecting knowledge use and fostering the illusion of newly qualified professionals being able to practise without further study (Goodlad, 1984; Eraut and Cole, 1993). Nursing and midwifery, however, are well placed to avoid this trap, having a strong tradition of post-qualification education, and structures such as PREP and the ENB Higher Award scheme in place.

Before curriculum guidelines could be developed, more insight was needed about (i) **how scientific knowledge is used in nursing and midwifery practice,** (ii) **how it is mediated through pre-registration education programmes** and (iii) **how it is developed in students**. This would support qualitative judgements about how best to develop students' ability to understand and apply it in practice. Hence these were questions the research had to address.

The original research brief was also concerned with policy implications for The Board and educational institutions, so the questions arising from reformulation of the problem were listed in the following order:

A. What scientific knowledge is relevant to the practice of recently qualified nurses and midwives, and in what ways is it used?

B. How is the scientific knowledge selected for inclusion in pre-registration programmes mediated to students and its linkage with practice communicated?

C. How does students' knowledge of this scientific content and its use in practice develop between entry and registration?

D. What are the implications for the design of curriculum, assessment and teaching arrangements?

E. What are the implications for the professional development of teachers of nursing and midwifery, mentors and others concerned with the delivery of pre-registration programmes?

The timescale of the research meant the areas of practice and the range of scientific knowledge investigated had to be restricted. Following discussion with the Steering Committee, three areas of practice were selected:

- Midwifery
- General adult surgical wards
- Mental health nursing.

The study of scientific knowledge was confined to six topics, chosen for their applicability across all three areas of practice, and the contrasting types of knowledge involved:

- Fluids, electrolytes and renal systems
- Nutrition
- Acute pain
- Shock
- Stress
- Self-esteem.

There was no established methodology for tackling questions A to C, so the development of an appropriate methodology was important. The limited scope of the research meant it should be transferable to enable others to extend the range of our findings; this would help educational institutions to develop in-house expertise to investigate these questions in their local contexts and conditions. Also, the role of midwives and nurses is changing rapidly, as is scientific knowledge: our research would become out-of-date in a few years and its findings would need updating.

It was decided that the practice to be studied under Question A should be that of experienced, rather than newly qualified practitioners, to establish some kind of standard to be reached by a combination of initial and continuing professional education and practice-based learning.

As a result of these focusing decisions, the main objectives of the research were formulated in the following terms:

1. To describe the use of scientific knowledge in six topics by experienced midwives and nurses in the areas of midwifery, adult surgery and mental health.
2. To describe the mediation of scientific knowledge in these topics in all components of pre-registration programmes, and the development of students' capability to use it in their own practice.
3. To develop methods and conceptual frameworks which can be used in extending the research to a wider range of contexts and circumstances and to further areas of scientific knowledge.
4. To discuss the implications of the evidence collected for the design of curriculum, assessment and teaching arrangements, and for the selection and professional development of lecturers, mentors and supervisors.

MAPPING THE USE OF SCIENTIFIC KNOWLEDGE IN PROFESSIONAL PRACTICE

2.1 The nature of professional knowledge and the role of scientific knowledge within it

Scientific knowledge and professional knowledge

Scientific knowledge can be divided into **propositional knowledge**, found in textbooks and research literature, and **process knowledge**, the know-how required to carry out the processes essential for inquiry and communication in the disciplines. This report concentrates on propositional knowledge, which includes facts, concepts, principles, theories, values and the range of currently acknowledged interpretations of these.

Professional knowledge is most conveniently defined as knowledge used for a professional purpose; it also includes both propositional and process knowledge, and may include common knowledge derived from everyday life. While greater attention is paid to propositional knowledge within the scientific disciplines, prime attention is given to process knowledge in most professions, including nursing and midwifery. People are judged competent or excellent according to the quality of their performance, not their store of propositional knowledge.

Process knowledge, however, cannot exist independently of propositional knowledge, some of which professionals always need to know. Such knowledge is frequently taken for granted, and much professional work is routinised so that processes get performed without awareness of the knowledge on which they are based. The first part of the research had to ascertain how much scientific knowledge is needed within our focus topics, and how it is used. The methodological problems of knowledge elicitation are discussed in the following section. Here we address the literature on the nature of professional knowledge.

Processes of professional work

Normal professional work can be usefully conceived in terms of four types of process:

1. Processes for acquiring and interpreting information about clients and situations.
2. Processes for deciding how to respond to this assessment both immediately and over a longer period.
3. Processes required for implementing agreed actions, including routine techniques, referral, giving advice, etc.
4. Meta-processes concerned with directing and controlling one's own behaviour and ongoing monitoring of clients and their environment.

These distinctions are clearly recognised in the nursing and midwifery literature, but it gives prime attention to the deliberative forms of these processes, where professionals interpret a situation, think through its implications, plan an appropriate response, then change the plan if necessary in light of ongoing monitoring. This is perhaps an ideal model for professional practice, giving prominence to analytic thinking and a strong professional knowledge base. It fits well alongside claims for research-based practice and training in higher education: the greater the use of deliberative decision-making, the more explicit will be the knowledge in use and the greater the motivation to incorporate 'relevant' scientific knowledge into professional processes.

Evidence from observations of practice and interviews with practitioners suggests that such deliberation occupies a relatively small proportion of their time; two explanations have been proposed. First, the majority of the time is occupied by skilled behaviour which is relatively routine once proficiency has developed. The issue is not whether significant parts of a practitioner's role are relatively routine, but whether the balance is right between routine processes and reflection. We must also recognise that interpersonal aspects of the professional-client relationship may be handled in a less routine manner than clinical aspects because the potential clinical relevance of personal and contextual information is not sufficiently appreciated. Even routine tasks can provide opportunities for learning about clients and keeping them informed about their situation, in which case routine action is accompanied by monitoring, reflecting and advising. One could argue that such multi-purpose use of time is an important indicator of quality in professional performance, an insight often obscured by the use of dichotomous labels like 'task-centred' or 'client-centred' practice.

The other explanation for the lack of prominence of deliberative thinking is that assessment and decision-making are not conducted in a deliberative manner. The most complete formulation of this viewpoint has been provided by Benner (1984), whose application to nursing of the Dreyfus brothers' (1986) theory (summarised in Figure 1) is a classic study of professional knowledge. Benner describes a developmental process involving changes in the mode of cognition as aspiring professionals progress from novice to expert.

Level 1 Novice

Rigid Adherence to taught rules or plans

Little situational perception

No discretionary judgement

Level 2 Advanced Beginner

Guidelines for action based on attributes or aspects (aspects are global characteristics of situations recognisable only after some prior experience)

Situational perception still limited

All attributes and aspects are treated separately and given equal importance

Level 3 Competence

Coping with crowdedness

Now sees actions at least partially in terms of longer-term goals

Conscious deliberate planning

Standardised and routinised procedures

Level 4 Proficient

See situations holistically rather than in terms of aspects

See what is most important in a situation

Perceives deviations from the normal pattern

Decision-making less laboured

Uses maxims for guidance, whose meaning varies according to the situation

Level 5 Expert

No longer relies on rules, guidelines or maxims

Intuitive grasp of situations based on deep tacit understanding

Analytic approaches used only in novel situation or when problems occur

Vision of what is possible

Figure 1: Summary of Dreyfus model of skills acquisition

Although the Dreyfuses call their model a 'theory of skill acquisition' its emphasis is perception and decision-making. In direct opposition to the ideal type which treats these processes as mainly analytic and deliberative, they argue that the use of deliberative approaches peaks at the competence stage of professional development. Progression beyond competence is associated with gradual replacement of deliberation by more intuitive forms of cognition.

> *'The proficient nurse learns from experience what typical events to expect in a given situation and how plans need to be modified in response to those events . . . the proficient nurse can now recognise when the expected normal picture does not materialise. This holistic understanding improves the proficient nurse's decision making; it becomes less labored because the nurse now has a perspective on which of the many existing attributes and aspects present are the important ones. Whereas the competent person does not yet have enough experience to recognise a situation in terms of an overall picture or in terms of which aspects are most salient, most important, the proficient performer considers fewer options and hones in on an accurate region of the problem.' (Benner 1984, pp 28-9)*

> *'The expert performer no longer relies on an analytic principle (rule, guideline, maxim) to connect her or his understanding of the situation to an appropriate action. The expert nurse . . . now has an intuitive grasp of each situation and zeroes in on the accurate region of the problem.' (Benner 1984, pp 31-2)*

Benner notes, however, that competence is typically acquired after two or three years in a same or similar situation and proficiency after another three to five years, which means the newly qualified practitioner will need to work in the deliberative mode for a significant period.

Both Benner and the Dreyfuses cite evidence to support the widespread use of rapid intuitive decision-making by experts, but do not establish their claim that deliberation has become virtually redundant. Benner recognises two situations where analytic approaches might be required: when an expert is confronted with a situation of which she has no previous experience, or when the expert gets a wrong grasp of a situation then finds that events and behaviours are not occurring as expected. Dreyfus and Dreyfus suggest a third possibility, that 'detached deliberation about the validity of decisions will improve decision-making'. (p 164) Roughly translated, if an intuitively derived decision proposal does not feel right or has an equally compelling alternative, think it through and check it out.

The authors' failure to follow this advice themselves is one of the main weaknesses in their theory. They persist in contrasting almost totally intuitive forms of expertise with mathematical decision-making models, and fail to recognise that professional deliberation is usually a mixture of intuitive and analytic processes. Elstein and Bordage's (1979) study of medical diagnosis suggests that physicians commonly generate hypothetic solutions to the problem, then test whether their findings support the hypothesis.

Another approach to deliberation can be found when the diagnostic model's basic assumption of a 'tight coupling' between diagnosis and treatment fails to hold. In such cases, a deliberative model has been advocated in which situational knowledge and possible courses of action are assembled, analysed and mulled over until a 'best fit' decision emerges. This final judgement, in which many factors are considered at once without any formal weighting of the relative significance, would be described by most people as intuitive rather than analytic. Such combined approaches have a advantage over purely intuitive or purely analytic approaches:

they enable experiences, intuitions and analytic skills of several people to be brought together in a single, albeit complex, decision-making process.

We agree with Benner that 'formal structural models, decision analysis, or process models cannot adequately describe advanced levels of clinical performance' observable in the best practice, and that intuition developed through experience plays a major part in experts' performance. This helps explain the methodological problems encountered in knowledge elicitation when experts cannot describe the nature of their expertise. Moreover the Dreyfus model provides a useful analysis of skilled behaviour under conditions of rapid interpretation and decision-making, in which acquiring information, following routines and making decisions are fully integrated. However, the self-evaluative dimension of professional work is missing, the process of learning from experience is idealised rather than researched, the myth of an almost infallible expert is perpetuated, and the criteria by which somebody might be accredited as an expert are unclear.

Development of professional knowledge

Two lessons emerge from the study of theories of expert behaviour: first, we should never assume that because decisions **are made** by experts in a particular way that is necessarily how decisions **ought to be made** – intuitive professional decision-making ignores the contributions of other professionals and the client; second, we should not ignore evidence about how experts make decisions in favour of an ideal whose feasibility has still to be demonstrated in practice. The sociological dimension is usually missing in the literature on professional knowledge, but Eraut (1994) has argued that the conditions under which professionals work play a critical part in the development of their knowledge base, affecting the kind of knowledge they need and the manner in which it has to be used.

Figure 2 depicts the relationship between the time taken and the way in which the first three types of process identified earlier are conducted. No assumption is made about the direction of causation, but the relationship is probably interactive. As more rapid modes of processing are developed through experience, their contribution to coping with crowded situations and high levels of service demand is welcomed, so coping routines get developed which may be sub-optimal for clients but preserve the sanity of the professionals concerned. The term 'reflectiveness' is used to indicate the occurrence of meta-processes such as monitoring. Under conditions of rapid action this reflection is necessarily intuitive, corresponding to one common interpretation of Schön's (1983) concept of reflection-in-action. As the timescale expands, the role of meta-processes becomes more complex, expanding beyond self-awareness and monitoring to include the framing of problems, thinking about the deliberative process itself and how it is being handled, searching for relevant knowledge, introducing value considerations, etc.

Process	**Speed**		
Interpretation of situation	Instant recognition	Rapid interpretation	Deliberative analysis
Mode of decision-making	Instant response	Rapid decisions	Deliberative actions
Reflectiveness of action	Routinised unreflective action	Action monitored by reflection	Action following a period of deliberation

Figure 2: The effect of speed on the nature of professional work (Eraut, 1995)

The need for deliberation

A preponderance of coping routines is necessary for productivity and psychological security, so there is a strong incentive to minimise deliberation, often reinforced by peer group norms. Hence there are good reasons for examining when deliberation is most needed and for debating the circumstances under which lack of deliberation is likely to lead to sub-optimal practice. The following arguments suggest why deliberation must always remain a central feature of professional work.

1. A significant number of cases fall sufficiently outside practitioners' normal experience to make rapid decision-making unreliable. These cases need to be recognised and appropriate responses worked out deliberatively, though without unduly delaying any required action.
2. Strategic thinking about the organisation of professional work, possible long-term problems for a client, how to get services for a client, etc, also requires deliberation time.
3. Teamwork and consultation cannot be practised without time for deliberation; and may significantly contribute to problematic cases and strategic thinking.
4. Consultations with clients cannot be properly conducted without moving into a deliberative mode on at least some occasions, or the client viewpoint will be stifled and client understanding of advice limited.
5. Routinised behaviour and rapid decision-making, though necessary for coping with the services of professional work, can also lead to mistakes. Professionals succumb to many common weaknesses shown by psychologists to be regular features of human judgement, and some may allow aspects of their expertise to become less relevant or even outdated. Professionals need to retain critical control over the intuitive parts of their expertise by regular reflection, self-evaluation and a disposition to learn from colleagues.
6. Dewey, Kolb and others have argued that in order to learn from experience consciously and critically, deliberative reflection is needed which compares and contrasts that experience with previous assumptions.

The amount of deliberation time required will depend on how it is used and vary from context to context. It is unlikely to be sufficient, however, unless professionals understand its continuing contribution to the quality of practice, and can make time for deliberation. All these should be outcomes of professional education.

The use of scientific knowledge in practice

This discussion of the roles of routine action, rapid decision-making and deliberation provides an essential platform for tackling the question of how scientific knowledge is used in practice. Explicit, self-critical use of scientific knowledge is only likely to take place during deliberation. Sometimes rapid decision-making will involve explicit, uncritical use of scientific knowledge, but more often that use will be implicit. Four rather different circumstances may pertain when scientific knowledge is thus used:

1. The practice was modelled on that of other professionals without understanding the reason for it or being aware of any underpinning knowledge.
2. The practice was developed with awareness of its rationale and underpinning scientific knowledge, but that awareness dissipated over time and with it the ability to explain or justify it.

3. The practice can still be justified by citing underpinning scientific knowledge, but could not withstand any challenge because there had been no critical evaluation of the practice since it was first adopted.
4. The practice can not only be justified but remains under the professional's critical control because it has been periodically re-evaluated.

Two problems are likely when the use of scientific knowledge is not under critical control: first, conflicts may arise in problematic cases between competing responses based on different principles – these cannot be resolved unless the underlying reasons for these principles are understood; second, there is a danger that scientific knowledge will be replaced by unscientific knowledge – that which falls within the domain of a scientific discipline but is regarded as incorrect or alarmingly incomplete.

Becoming a professional is commonly regarded as making a moral commitment to serving one's clients' interests and developing one's knowledge base in order to continue to do so. Even when decisions and actions are rapid and intuitive, professionals need to maintain critical control of their actions. This involves understanding the contribution of scientific knowledge to practice and being prepared for new knowledge which might improve service to clients.

2.2 Methodology for eliciting practitioners' use of scientific knowledge

The research question to be addressed was 'What scientific knowledge gets used in nursing and midwifery practice and how?' Practitioners do not organise their knowledge in some kind of textbook format, ready for transmission out of context; and their frequent recourse to tacit, intuitive use of scientific knowledge has already been noted, so we had to find ways of stimulating their recall and eliciting the tacit knowledge which underpinned their practice. We thought some kind of non-standardised interview was needed and determined to explore possible approaches through piloting a variety of interview procedures.

Our enquiry was limited to three areas of practice but we had time for only 6-10 interviews in each area. This prevented us from exploring the full range of contexts within each area, but we tried to get some variety. We did not assume that knowledge use would be the same in different clinical settings. We sought to provide a standard which novice midwives and nurses might need to reach after a period of post-registration experience, without making assumptions about what should be expected at the point of registration. Interviewees, therefore, were experienced practitioners, well regarded by their peers, and where possible, with a preceptor role. Being a preceptor, we surmised, might have raised their awareness of their own knowledge base and thus facilitated our work. Details of the interview sample are given in the Appendix.

Interviews lasted one-and-a-half to two-and-a-half hours; conversations were tape recorded. Normally, there was only time to pursue three or four project topics in an interview; these were not preselected but followed up as opportunities arose during the interview. Four main strategies were useful in eliciting information about use of scientific knowledge in practice:

1. Recent cases selected by the respondent.
2. Orientation of newly qualified and other new staff to a clinical area.
3. Learning required of a student.
4. Concept mapping.

1. **The recent case approach** was initiated by asking the respondent to discuss a recent case for which knowledge from one of the project topics had been important and to talk about it in some detail. The interviewer intervened from time to time and followed up the main account with questions of clarification and judgement:

> What did they look like?
>
> How did you know that?
>
> What factors did you take into account when making your decision?
>
> What knowledge did you draw on?
>
> What other information did you seek?
>
> Why that action and not another?
>
> How did you interpret that?
>
> Why did you think that happened?

A good example of this approach was when a nurse described an incident in which she and a doctor had come to different judgements about the need for analgesia. This elicited information about assessment of the client, factors influencing their judgements and the reasons for their disagreement; it gave a good insight into how the nurse's practical knowledge about pain incorporated knowledge of physiology, psychology and sociology.

2. **Discussing the orientation of new staff to a clinical area** elicited information about the kind of knowledge use found difficult by newcomers. Respondents were asked to describe what they knew which others did not know or were unable to use in practice.

A good example occurred in a discussion about fluids and electrolytes, in which our respondent described how initial assessment of clients led to 'hunches' about their status, which led him to initiate tests and investigations and to prioritise the order in which clients were seen by the doctor. For example, he was not only aware that urine retention can cause back flow in the kidneys and consequent damage, but could also begin to assess how far the process had gone by using information from the client's history and from investigations he had initiated. This would probably be beyond the competence of nurses new to the area, but he would hope they had the physiological knowledge to build on.

3. **Asking about the learning required of a student** encouraged respondents to compare their own level of knowledge with that of students who appeared unable to use relevant scientific knowledge when confronted with clients' problems. What did students see or not see? What did they need to consult trained staff about? This provided an opportunity to discuss respondents' own knowledge in a non-threatening manner.

4. **Concept mapping** Our first approach was to present the respondent with a partly constructed concept map of the topic and invite them to add links, amend and extend it. This was difficult without a context or specific case in mind; it was an unfamiliar approach, and yielded little useful information. A more successful variation involved one person conducting the interview while another used concept mapping to record an evolving description of the knowledge elicited. These maps were presented to the respondent for comment. This led to clarification of terms, discussion of relationships between different parts of the map, and the addition of concepts not yet discussed. Respondents could also differentiate between what they considered essential core knowledge required of all practitioners and additional knowledge needed in their clinical area. This approach was highly labour intensive, and was abandoned after the pilot interviews.

Following this first set of interviews, the research team had to decide how best to represent the interview data so that its significance could be readily grasped. A series of discussions, trials and external consultations led to what we came to call **knowledge maps**. These have a **matrix framework** in which **theoretical topics** are **rows** and **practical** processes are **columns**. This is depicted in Figure 3; asterisks indicate where knowledge of a particular theoretical topic was considered necessary for good practice in a particular process. Column headings represent what the practitioners interviewed thought they had to do, either in assessing the situation or responding to it; the row headings represent what they needed to know in order to do it or to explain why they were doing it. The use of these matrices moved the focus of our research from justifying theory because it was relevant to ascertaining for what precise purposes it was needed.

Figure 3: Acute pain in adult surgery

	ASSESS PATIENT				ASSESS PAIN			INTERPRET CAUSE					
	Personality A	Knowledge B	History C	Vital signs D	Ability to cope E	Intensity F	Unrelated to surgery G	Signs of infection H	Haematoma I	Retention of urine J	Constipation K	Wound assessment L
1. Nerve pathways				*			*					
2. Transmission / Perception of pain		*				*	*		*	*	*	*
3. Causes of pain	*	*	*	*	*	*	*	*	*	*	*	*
4. Effects of pain	*	*		*	*	*				*	*	
5. Bacteriology			*	*			*	*		*		*
6. Pharmacology			*									
7. Anaesthesia			*	*			*					
8. Wound healing				*				*	*			*
9. Barriers to expression of pain	*	*	*		*	*						
10. Pre- and post-operative care			*		*	*		*	*	*	*	*
11. Alternative methods	*	*			*	*						

	ALTERNATIVE METHODS								DRUGS				ASSESS RESPONSE	
	Position M	Explanation N	Companion O	Warmth P	Pressure area care Q	Wound dressing R	Catheter-isation S	Diet T	Analgesics U	Anti emetics V	Antibiotics W	Anti inflammatory X	Intensity of pain Y	Vital signs Z
1. Nerve pathways					*		*		*					
2. Transmission / Perception of pain		*			*		*		*				*	
3. Causes of pain	*	*			*	*	*						*	*
4. Effects of pain	*	*	*											
5. Bacteriology					*	*	*		*		*	*		
6. Pharmacology									*	*	*	*		
7. Anaesthesia									*				*	
8. Wound healing				*		*		*			*	*		
9. Barriers to expression of pain		*											*	
10. Pre- and post-operative care	*	*	*	*	*	*	*	*	*				*	*
11. Alternative methods	*	*	*	*				*						

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A further refinement was the use of the boxes in the matrix to show how the knowledge is used. This was achieved by replacing each asterisk by a code which indicated the mode of knowledge use. An example of a knowledge map with the **knowledge use codes** included is given in Figure 4, while the codes are explained in Section 2.3.

We were not only concerned with the format of the knowledge maps, but also needed to validate their content. We therefore took them back to our original interviewees to seek respondent validation. Respondents found the knowledge maps difficult to understand at first, but the more they discussed them the more comprehensible they became. They soon understood the matrix structure, but many had difficulty in comprehending the coding system. We believe this is largely because thinking about how knowledge is used was a new experience for them. Thus we advise that more confidence is placed in the location of entries in the matrix than in the precise codes allocated. Most of the changes made after these second interviews took the form of further entries written within the existing matrix or changes in the coding. There were only a small number of changes in the matrix headings, and very few entries were deleted.

Figure 4: Stress in midwifery

	ASSESSMENT AND MONITORING				RECOGNITION						RESPONSES		
STRESS MIDWIFERY	Presentation physical psychological A	Self awareness B	Foci of stress antecedents situational C	Normal coping mechanisms D	Normal / abnormal E	Acute / chronic F	Functional / dysfunctional G	Risk assessment H	Seek further information I	Identify need for action J	Seek help from others K	Modify environment L	Promotion of adaptation M
1. Manifest responses to stress													
physiological	U3	R2	R3	R3	U3	U3	U3	U3	U3	U3	U3	U3	U3
psychological	R2	R2	R2	R2	R2	R2	U3	U3	R2	R2	R2	R2	R2
2. Common sources of stress	R2	R2	R2	R2	R2	R2	U3	U3		U3	U3	R2	U3
3. Sources related to illness / hospital	R2	R2	R2	U3	R2		R2	U3		U3	R2	U2	U3
4. Theories and models of stress	R2	R2	R2	R2			R2	R2	R2	R2	R1		
5. Factors affecting an individuals response to stress intrinsic / extrinsic	U3	R2	R2	R2	R2	R1	R1	U2	R2	R2		R2	R2

ACCESSING KNOWLEDGE

R = Appreciating the relevance

U = Understanding and interpreting

USING KNOWLEDGE

1 = Simple application

2 = Situational adaptation

3 = Problem solving

Twenty-one knowledge maps were produced (Figure 5). The gaps appear where practitioners regarded the topic as unimportant. Midwives were reluctant to embark on detailed discussion about fluids and electrolytes, which was rarely an issue with their normally healthy clients; their role was simply to recognise any clinical signs of illness and refer to medical staff when necessary. Mental health nurses also regarded fluids and electrolytes as marginal to their practice, and showed little interest in nutrition.

Topic	General Adult Surgery	Midwifery	Mental Health Nursing
Acute pain	1	1*	1*
Fluids, electrolytes and renal systems	1	–	–
Nutrition	1	1*	–
Shock	1	1*	1
Stress	1	1	1
Self-esteem	3	3	3

Figure 5: Distribution of knowledge maps developed by the project

Self-esteem presented rather different problems, which were eventually resolved by developing charts for three types of situation:

1. Where self-esteem is a significant part of the health problem.
2. Where self-esteem is affected by the client's current and anticipated health condition.
3. Where self-esteem is endangered by contact with health professionals.

For five of the six project topics the headings used for the maps were identical for general adult surgery and mental health. Midwifery required additions to cover areas specific to pregnancy, and excluded acute symptoms unlikely to be handled by midwives. In acute pain, however, very different sets of headings emerged from the three areas of practice investigated.

2.3 How scientific knowledge is used by experienced practitioners

Trying to ascertain **how** scientific knowledge is used is even more challenging than trying to find out **what** scientific knowledge is used. Most professionals understand the meaning of the 'what' question and the kind of answer expected, but very few know what kind of answer would be appropriate for the 'how' question, for which there is no readily available typology of answers, not even a common vocabulary. The project team made several attempts to develop a coding system which satisfied the following four criteria:

1. It had to be usable in categorising our data from the first set of interviews.
2. It had to be theoretically defensible.
3. It had to be usable in discussing and checking our findings in the second set of interviews with experienced practitioners.
4. It had to be comprehensible to potential users of our research.

Our eventual solution was to take advantage of the matrix format of the knowledge maps by combining the answers to two questions, one with a **knowledge focus** and one with a **practice focus**.

1. **What knowledge do we need and in what ways is it relevant?**
   (the row focus)

   Either **R** Appreciate its relevance so that it affects our general thinking about the situation.

   Or U Understand and interpret it in a very specific way which determines what action is taken.

2. **How do we use the knowledge in order to decide what action to take?**
   (the column focus)

   Either 1. Only simple application of the knowledge is required.

   Or 2. Knowledge use has to be adapted to suit the particular situation.

   Or 3. Problem solving is required to determine the most appropriate course of action.

Pairing an R or U with a 1, 2 or 3 gave the coding system presented in Figure 6.

	Demands of the process in some situations		
Mode of use of scientific knowledge	**Simple application**	**Situational adaptation**	**Problem solving**
Appreciating the relevance	R1	R2	R3
Understanding and interpreting the knowledge	–	U2	U3

Figure 6: The coding system for mode of knowledge use

Before discussing the theoretical justification for this coding system, it is useful to consider some examples of the system in use. Panel A discusses the content of box 2H from Figure 4, **Stress in Midwifery**, which concerns the use of knowledge about **common sources of stress** (row 2) when making a **risk assessment** (column H).

Panel A: Using knowledge of common sources of stress during risk assessment in midwifery (Box 2H, coded U3)

The context for this box is the midwife's aim of making pregnancy, birth and the post-natal period a positive experience. Stress detracts from that aim and can have significant negative consequences for the health of the mother and baby, so the midwife needs to be aware of common sources of stress when making a risk assessment. The process of risk assessment, however, demands more than awareness of these sources of stress; the midwife must assess their effect on the woman's current behaviour and estimate their possible future significance. The discussion of issues and possible risks is part of the assessment process, and it would be difficult to assess the impact of sources of stress without understanding the client's views. Moreover, the ethics and practicalities of the situation require that no action be taken without the woman initiating it or consenting to it. The process often involves problem-solving (hence the U3 coding) because there may be several interrelated sources of stress, and a considered judgement has to be made about the overall risk to the health of the woman and her baby which takes into account the unique circumstances of each case.

While some sources of stress may be relatively easy for students to understand and interpret, others present considerable difficulty. Negative life events may be readily noticed by a methodical interviewer but assessing their current or future impact on health is more difficult. Psychological aspects of adaptation to pregnancy may not be easy to interpret. In more complex cases the gradual accumulation of professional experience will be an important contributor to the quality of judgement.

Risk assessment also requires considerable social skill, and must not itself become another source of stress. In practice, the client's perspective is more likely to be that of being engaged in a friendly conversation, being able to ask questions and get advice and receiving psychological support from the midwife; the midwife seeks to play that role but also has the professional duty of assessing risk and using the conversation to raise issues for discussion which might have a bearing on that assessment. The overall process is most likely to work well when there is continuity of care, characterised by a growing relationship of mutual trust and understanding. A midwife who already knows the woman will have greater situational understanding and will be more likely to notice any change in levels of stress between meetings.

Panel A indicates the complexity of thinking associated with a problem-solving situation which requires considerable knowledge and deep understanding of stress. Although experience is invaluable, use of the U3 code assumes that individual differences will ensure risk assessment will often demand problem-solving responses from midwives.

A second example discusses the content of box 6C from Figure 3, **Acute Pain in Adult Surgery**, which concerns the use of knowledge of **pharmacology** (row 6) when taking a client's **history** (column C) on an adult surgical ward.

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Panel B: Using knowledge of pharmacology when recording a client's history on an adult surgical ward (Box 6C, coded U2)

Collecting information about a client's prior experience of drugs is an important part of history-taking for several reasons:

> Any drugs still present may affect the client's current condition and the advisability of administering new drugs.
>
> Evidence of previous effects and side-effects will inform current decisions and priorities for monitoring.
>
> Any current or previous addiction needs to be taken into account.
>
> The client's familiarity with, usage of and confidence in certain drugs will inform drug selection and dosage.
>
> Information may be elicited about the client's attitude to pain management and the use of drugs which will inform ongoing assessment of their needs.
>
> Information about previous use of drugs will provide information about compliance and suggest how to prepare the client for self-medication after discharge.

Nurses need enough knowledge of pharmacology to understand the significance of the questions they are expected to ask when taking a history, and to know the kind of information they need to elicit from clients. This will be demonstrated in the way they follow up clues offered by the client with probes for further detail. The necessary pharmacological knowledge is summarised below, together with a list of history-taking questions. But in order to use this knowledge they need to be alert to the significance of the information they receive and adapt their questioning to the emerging account from the client. Hence the allocation of a U2 coding.

Pharmacology

Nature and types of drugs used in pain management. Actions and effects of each type of drug. Dosage calculation. Modes of delivery and routes of entry to the body. Side effects and contraindications. Advantages and disadvantages of using drugs as single agents and in combination therapy. The ladder of analgesic agents. Methods of assessing therapeutic actions and responses. Use and abuse of opiate drugs, including addiction.

History-taking

What drugs has the client taken in the past?

What effects did the drugs taken have on the client – both positive and negative?

Were the drugs taken self-prescribed or medically prescribed?

How long have the drugs been taken for?

What factors influence the taking of drugs, what factors increase or decrease the pain including exercise, distraction and non-drug remedies?

What do they know about the drugs being taken and from where was the information gained?

What is the normal dosage taken by the client and the normal frequency; and in what circumstances is this varied?

Respondents were inclined to enter Us rather than Rs unless they considered that the issue was whether or not to refer to or consult other professionals. A good example of the practical importance of even an R coding was provided by an account of a group of student nurses observed to wear gloves for aseptic procedures then put them in their pockets. Correcting this practice did not require much understanding of microbiology, just recognition that microbes could be moved around on the outside of unwashed gloves.

The 1, 2, 3 categorisation is as follows: simple application (1) is when practitioners know what to do because they remember the relevant knowledge. The action is not significantly different in different situations, so the decision making process is simple; no U1 codes were used, because little depth of understanding is required for simple applications. Problem solving

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(2) is used when the practitioner expects to meet situations which are sufficiently complex and novel as to require deliberative problem-solving. Situational adaptation (3) refers to contexts where interpretation of the scientific knowledge will differ according to the situation. The 1, 2, 3 codes represent levels of intellectual effort, but should not be construed in terms of levels of expertise. A newly qualified competent, practitioner may have to engage in problem solving, when a more experienced colleague might have used situational adaptation.

Knowledge maps for fluids, electrolytes and renal systems and for nutrition are given in Figures 7 and 8, while examples of codings within them are briefly presented in Panels C and D.

Panel C: Some codings from fluids and electrolytes (Figure 7)

Because the work is carried out by a doctor, Box 4B in General Surgery, **the use of biochemical knowledge when assessing biochemical results**, was coded **R1**. However Box 4T, **the use of biochemical knowledge when checking laboratory slips**, was coded **U3** because:

'The nursing staff actually see biochemistry results that come back. We work out which ones should be put aside for the doctors. We work out which ones need to be looked at immediately as opposed to the next day.'

The need to describe whether immediate action is needed gives it the **U3** coding, while dealing with regularly occurring variations merits a **U2** once a modicum of experience has been completed. While the example below mentions 'individual cases' it essentially refers to distinguishing between a well recognised set of variations:

'I think everybody's blood pressure is different and you have to take each individual case. I think if somebody's blood pressure might be 90 systolic and they might have a brilliant urine output on that, and somebody else who normally has a systolic of 160 – their urine output may be low on that, so I think you need the whole picture really.' [Box 8D, coded **U2**]

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Figure 7: Fluids, electrolytes and renal systems (page 1)

ASSESSMENT AND INTERPRETATION

AREAS OF KNOWLEDGE	Constraints. NBM & Surg. A	Biochem. Results B	Cardiac dysrhytm. C	CVS changes: BP, P, CVP D	Current orders E	Urine O/P & other fluid O/P's F	Gen. Activity Levels: mental/physical G	Nausea & Vomiting H	Status peripheral tissues I	Risk factors J
1. Electrolytes and ionization		U2	U3		R2			U2		
2. Interstitial circulation				R2		U2			U2	
3. Water compartments	R2			R2				U2	U2	
4. Biochemical knowledge		R1								
5. Hydration status	R1	U3		U3		R2		U2	R2	R1
6. Acid / base balance	R2	U3								
7. Fluid and electrolyte need	R1				R2	U2		U2		U3
8. Renal function		R2		U2		U2				
9. Oedema mechanisms				U2		U2	U2		U3	
10. Risk situations for electrolyte imbalance	R2				R2					R2
11. Features of potassium imbalance		U3	U3				R2			
12. Features of sodium imbalance		U3		U3						
13. Features of acid / base imbalance		U3						U2		R2
14. Features of acute renal failure		U3	R1			R1	R2	R1		
15. Features of fluid overload			R2	U3		R2	R2			U2
16. Outflow obstruction		U3				R2				R3
17. Features of azotaemia		R1						R1		
18. Features of chronic renal failure	U3	U2				R2	R2	R1		
19. Anaemia in renal failure		R2					R2			
20. Nutrition in chronic renal failure		U3								U2
21. Consequences of hypoproteinaemia									U3	U2
22. Catheter management										U2

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3 = Problem solving

	ASSESSMENT AND INTERPRETATION			RESPONSE						MONITORING	
AREAS OF KNOWLEDGE	History K	Pruritis L	Resp. changes M	Advice / Explain N	IV Fluids O	Catheter P	Referral Q	Anti-emetics R	Rehydrate S	Check lab. slips T	Cardio/resp. state U
1. Electrolytes and ionization					U2						
2. Interstitial circulation											
3. Water compartments											
4. Biochemical knowledge			U3						U2	U3	
5. Hydration status					U3						U3
6. Acid / base balance											
7. Fluid and electrolyte need	R2				R2						
8. Renal function											
9. Oedema mechanisms			U3				R2				
10. Risk situations for electrolyte imbalance					R2					R2	
11. Features of potassium imbalance	R2			R1			R2			R2	U2
12. Features of sodium imbalance	R2			R1			R2			R2	U2
13. Features of acid / base imbalance	R2		U3	R1			R2			R2	U3
14. Features of acute renal failure	R2		R2	R2					U3	R2	U2
15. Features of fluid overload			U3								U3
16. Outflow obstruction						R1				R2	
17. Features of azotaemia										R2	U2
18. Features of chronic renal failure		R2		U2				R2		R2	U2
19. Anaemia in renal failure				R2						R2	U2
20. Nutrition in chronic renal failure				U2			R2				
21. Consequences of hypoproteinaemia											
22. Catheter management				R2		U2			R2		

Figure 7: Fluids, electrolytes and renal systems (page 2)

ACCESSING KNOWLEDGE	USING KNOWLEDGE
R = Appreciating the relevance	1 = Simple application
U = Understanding and interpreting	2 = Situational adaptation
	3 = Problem solving

ASSESSMENT AND INTERPRETATION

KNOWLEDGE AREAS OF NUTRITION	Appearance and age A	Feeding ability B	Activity level C	Emotional state D	Mouth and tissue turgor E	Risk factors F	Pre-exist medical cond. G	Abdominal signs H	Dietary history I	Dietary intake J	Overt nut. deficiency K
1. Normal nutritional need	R1		R2			R2	R2		R1	R2	
2. Factors which alter nutritional need	U2	R2	R2	R2		R2	R2	U3	R1		R2
3. Hydration			R2		U3	U3	U2	R2	R1	R2	
4. Cultural factors in nutrition						R1	R2		R2		
5. Anat. and phys. of gastro-intest. tract						U2				R1	
6. Food constituents			R2						R1	R2	U3
7. Emotional influences on nutrition		R2		R2			R2				
8. Eating and swallowing		R2									
9. Nutritional intake	R2	U3	R2	R2	U3		R2		R1	R1	
10. Features of malnutrition	R2	R1			R1		R2	R1			U3
11. Awareness of risk states		R1	R2	R1		R2	R2		R1		
12. Alternate ways of meeting nutrition need		R3									
13. Biochemical features of altered nutrition						R1	U2				U2
14. Obesity and starvation	R2	R1	R2	R2		R2			R1		
15. Consequence of low protein intake						U3	U2	R2			
16. Intestinal obstruct.: dynamic / adynamic					U3	U3	U2	U3			
17. Malabsorption			R2			R2	R2	R2	R2		
18. Management of TPN					R2	U2					
19. Nutrition in burns	R2		R2						R2		
20. Nutrition in liver dysfunction	R2		R2						R2		
21. Nutrition in renal dysfunction	R2		R2						R2		
22. Nutrition in diabetic states	R2		R2						R2		
23. Nutrition in altered mental states	R2	R2	R2	U3					R2		

ACCESSING KNOWLEDGE	USING KNOWLEDGE
R = Appreciating the relevance	1 = Simple application
U = Understanding and interpreting	2 = Situational adaptation
	3 = Problem solving

Figure 8: Nutrition in general adult surgery (page 1)

	ASSESSMENT AND INTERPRETATION			RESPONSE					MONITORING	
KNOWLEDGE AREAS OF NUTRITION	Body weight and fat distribution L	Elimination status M	Client knowledge and attitudes N	Urgency O	Referral P	Supplementary feeding Q	NG feeding R	TPN S	Frequency of monitoring T	Weight U
1. Normal nutritional need		R1	R2		R2				R1	R2
2. Factors which alter nutritional need		R2	R2							
3. Hydration		R2	R2	U3	R2				R1	R1
4. Cultural factors in nutrition	R2				R2					
5. Anat. and phys. of gastro-intest. tract	R2	R2					U2			
6. Food constituents		R2	R2				R2			
7. Emotional influences on nutrition	U2									
8. Eating and swallowing										
9. Nutritional intake	R2		R2			R2			R1	
10. Features of malnutrition	R2	R1		U3	R2			R2		
11. Awareness of risk states				R2				R2	R1	R2
12. Alternate ways of meeting nutrition need					R2	R2	R2	R2		
13. Biochemical features of altered nutrition				U3						
14. Obesity and starvation	U3		R2							R1
15. Consequence of low protein intake				U3	R2					
16. Intestinal obstruct. : dynamic / adynamic		R2								
17. Malabsorption		R2	R2							
18. Management of TPN								U2		
19. Nutrition in burns						U2				R2
20. Nutrition in liver dysfunction			R2			U2				R2
21. Nutrition in renal dysfunction			R2			U2				R2
22. Nutrition in diabetic states			R2			U2				R2
23. Nutrition in altered mental states						U2				R2

ACCESSING KNOWLEDGE	USING KNOWLEDGE
R = Appreciating the relevance	1 = Simple application
U = Understanding and interpreting	2 = Situational adaptation
	3 = Problem solving

Figure 8: Nutrition in general adult surgery (page 2)

Panel D: Some codings from nutrition (Figure 8)

Box 2F in General Surgery is concerned with using knowledge about factors which alter nutritional need to assess risks. No depth of understanding is required, just a sense of what is entailed in assessing the nutritional status of this kind of client. Hence it is coded **R2**.

'She had bowel surgery, major bowel surgery and therefore we know that her nutritional requirements would be higher than a person who had not had surgery.'

Box 15F, however, concerned with **knowing the consequences of low protein intake**, is coded **U3** because good understanding is required to **assess the risks** entailed and decide how they might be reduced.

'She needed to have more proteins because the blood protein and albumin levels were low and if they are low you get protein dependent oedema which further compromises peripheral tissues and increases the risk of skin damage.'

Other coding issues noted by our respondents concerned differing expectations of newly qualified and more experienced practitioners and the effect of specialisation. Dealing with shock in midwifery it was noted that a newly qualified midwife who has never cared for a woman suffering from shock would appreciate the relevance of brisk, post-partum blood loss because of her knowledge of the subject (R1), but an experienced midwife would also interpret the individual situation, problem solve and respond appropriately (U3).

In general surgical areas most of the row on biological determinants of self-esteem was normally coded R2, so that causal factors can be recognised in a familiar range of situations and action taken if necessary, e.g. referring a stroke client to a speech therapist. A more complex situation arises, however, when factors affecting self-esteem are considered in relation to family and supporter views. It was suggested that newly qualified nurses would need to be at the R2 level, but one would expect more experienced nurses in areas like stroke rehabilitation to be able to operate at level U3.

Similarly, two nurses working on a urology ward upgraded their codings to 'problem solving' when using knowledge of hydration status, fluid and electrolyte need and renal function to interpret symptoms of nausea and vomiting (Figure 7 column H); because they had clients with kidney dysfunction. This level of complexity would not have been expected in most other clinical areas.

These examples illustrate the relationship between our interview evidence and the coding system. The coding of several entries in our charts is unlikely to command total agreement, but the absence of a universally agreed 'right answer' should not deter relevant teaching and learning. Most practitioners were initially mystified by the coding system; we eventually concluded that immediate comprehension was an unrealistic goal. Professionals in general have no experience of discussing how knowledge is used, and the concepts underpinning the coding system need careful explanation. When respondents in our second interviews discussed the appropriate code for a particular box, they began to understand and appreciate the significance of the system, and were in no doubt about its importance for professional education.

2.4 Using the knowledge maps in practice

The information represented by the knowledge maps is highly dependent on the headings chosen for the rows and columns. These were derived from analysis of the first set of interviews, and seemed to represent categories used in the normal professional discourse of our respondents. However, we were also aware that many plausible alternatives could be constructed, either by combining some categories or by dividing them into smaller components. The criteria used in deciding the most appropriate level of aggregation were whether:

1. Division would result in different codes for each component.
2. Division would result in separate teaching for each component.
3. Headings for combined columns or rows would sufficiently indicate the range to be covered.

Our view is that different levels of aggregation are needed for different purposes, and our prime purpose was to evaluate the contribution of scientific knowledge to pre-registration curricula. If we had been concerned with the detailed planning of teaching, greater detail would have been helpful. For example, one could replace each box with a teaching brief the size of Panel A or Panel B.

Our knowledge maps should not be regarded as curriculum specifications. They are not specifications of what has to be learned, they simply indicate what scientific knowledge is needed in nursing and midwifery practice and when it is needed. Entries do not indicate the totality or even the general nature of a column's process heading, only the contribution of scientific knowledge to that process; in some cases this may account for a high proportion of the process knowledge needed for competent performance, in others the proportion may be quite small but still significant and occasionally vital. We should note our considerable concern that one group of tutors suggested that, while they taught the content of the topics in a planned and accountable way, the process aspects of performance were left for students to pick up in their placements.

The coding of modes of knowledge use is also of great practical relevance to the education of nurses and midwives. It gives some indication of what scientific knowledge is needed, and suggests the depth of understanding required and the range of its application. More crucially, it draws attention to the amount of further learning required whenever the aspiring professional has to use scientific knowledge for situational adaptation or problem-solving. This suggests the need for the guided study of the use of that particular area of knowledge in a significant number of cases and across an appropriate range of cases.

Coding is, however, only an abbreviated indication of what is sometimes a complicated example of knowledge use. The neat boxes in the knowledge maps may give a misleading impression of a tidy, organised certainty. The maps have brought some order to hitherto uncharted territory, but blowing up the boxes to critically examine their contents in greater detail will reveal that many have Pandora-like qualities. Some indication of their complexity is given by the examples in Panels A and B above.

The other dimension of knowledge use given relatively little attention by our project was the combined use in many cases of knowledge drawn not only from several boxes at once but also from several maps at once. Panel E presents extracts from an interview with an experienced nurse in a urological surgical area which draw on knowledge from three of our maps: fluids, electrolytes and renal systems; self-esteem and stress.

Panel E: Extracts from a practitioner interview showing the need to use several boxes from several maps to provide care for a single client

'On this ward we deal with elderly people and they are acutely affected by change and if they are retaining (urine) their health is compromised . . . They have a full bladder and in a few days may develop a hydronephrosis and eventually everything is compromised and the client is at great risk.'

'Somebody who comes in because they have changed in the last four weeks, they get quite stiff, they feel unwell, they are getting up in the night, they are not getting enough sleep, they have renal problems, they might be anaemic and probably highly anxious.'

'The client was asked to come into hospital by taxi, but you can't just get up and go if you are having such a diuresis. You are going to the loo every five minutes, you drink tea and you go even more often, it's such a big stress. Anyone can go into hospital normally but when you're old and unwell there is a lot more. You are taking them out of their environment, you need to think about stress adaptation.'

We noted the relevance of 10 of the 22 knowledge areas from fluids, electrolytes and renal systems, four out of six from stress and six out of seven from self-esteem 2 (self-esteem changed by a current or anticipated health condition).

The nurse interviewed clearly demonstrated a holistic approach to assessing clients, but still had to draw on scientific knowledge of many kinds. Without that detailed knowledge and the ability to use it in context, her assessment would have been sub-optimal, possibly even risky. To use scientific knowledge in practice, practitioners need both to be able to use it in the manner suggested by the knowledge maps and make holistic decisions on how to best provide care which draw on knowledge from several maps (including maps not yet developed). Teaching students what is implied by the maps is necessary but not sufficient; they also need to discuss a large number of individual cases, first indicating which boxes are relevant to each case then deciding which boxes should be accorded the highest priority.

Since none of the pre-registration programmes studied had access to the knowledge maps or even to the thinking behind them, it would be unreasonable to attempt to link the maps with the case studies in Chapter Three, but they do indicate that few programmes are structured in a manner which accords significant priority to helping students learn to use scientific knowledge in nursing and midwifery practice.

A supplement to this report, containing all the headings of the knowledge maps, and all the maps developed, can be obtained from: Assistant Director for Educational Policy (R&D), English National Board for Nursing, Midwifery and Health Visiting, Victory House, 170 Tottenham Court Road, London W1P 0HA.

CHAPTER 3

MEDIATION OF SCIENTIFIC KNOWLEDGE INTO PROFESSIONAL PRACTICE DURING PRE-REGISTRATION PROGRAMMES

3.1 Traditions and other influences on professional education curricula

Historically, professions have employed several modes of training and preparation, often in combination; each makes a distinctive contribution to students' knowledge base and socialisation into the occupation. They include:

- a period of pupillage or internship, when students learn their 'craft' on-the-job from an expert
- enrolment in a 'professional college' outside the higher education system
- a qualifying examination, normally set by a qualifying association for the occupation
- a period of relevant study at a college, polytechnic or university leading to a recognised academic qualification
- the collection of evidence of practical competence in the form of a log-book or portfolio.

When free of assessment, pupillage focuses on the acquisition of craft knowledge through demonstration, practice with feedback and possibly coaching, and strongly influences the development of standards and values. Quality assurance is based on the reputation of mentors and the employing organisations in which students served their 'apprenticeships'. Although more formal methods of assessing practice are increasingly common, the ethos of practical competence being judged by experienced practitioners on-the-job remains in most professions.

Qualifying examinations rose to prominence in the latter half of the nineteenth century, and gave considerable power to the organisations that introduced them. The change simplified entry into the professions and created national standards for the knowledge tested, leaving judgements of practical competence in the hands of local practitioners. One major consequence was the transformation of large areas of the professional knowledge base into codified forms which suited the textbooks needed to prepare students for these examinations, but paid scant attention to their appropriateness for facilitating the use of scientific knowledge in practice.

Examinations have also been important within higher education, affecting how what is learned is selected from what is taught and what is taught is selected from what is known. There is also ample evidence to confirm their strong effect on students' learning strategies (Snyder, 1971; Miller and Parlett, 1974). The essential differences between university-based and other forms of professional preparation have been that:

- universities form part of a recognised international system of education with clearly understood modes of entry and universally valued awards
- the general education associated with universities has become increasingly valued, not least by students
- universities have a recognised independent role in the creation and validation of knowledge.

As the scope of higher education has expanded, the professions have recognised that they can no longer afford to ignore the talent entering higher education, and increasingly need university validation to confirm the status, worth and complexity of their knowledge-base. However, they also lose a significant degree of control over part of the professional preparation process; they can influence university programmes of education, but cannot fend off university influences on staff and students. Responsibility for the assessment of practical competence has usually remained with the profession, even when it has been incorporated into the higher education award. This has proved easier for regulatory bodies to control than when assessment is left in the hands of employers (Eraut and Cole, 1993).

The incorporation of professional training into higher education has had profound consequences. Many professions have benefited from strengthening the research base and receiving entrants with a stronger foundation in theoretical knowledge and more fully developed analytical skills, but this theoretical knowledge has been mainly book knowledge, separated from its practical application. Significant aspects of this change, discussed in greater detail in Eraut (1994), include:

1. Teaching by non-members of the profession, who are often ill-prepared to make optimal selection of content and provide students with authentic examples of knowledge use.
2. Members of the profession becoming socialised as academics into giving lower priority to practical knowledge and highest priority to 'scientific' knowledge.
3. Examined knowledge being selected and framed to accord with the norms of higher education, reinforcing the effect of (2) on the 'theory' components of the programme of education.
4. Modularisation, leading to the segmentation of knowledge which has to be brought together for thinking about practical situations.

Although this widening gap between book knowledge and practical knowledge is generally acknowledged, there are significant barriers to resolving it. One barrier addressed in Chapter 2 is our limited understanding of the nature of practical knowledge; the second is that insufficient attention is paid to how book knowledge is used in practice. Even when sufficient staff in education and service settings understand how scientific knowledge can be used, they may have difficulty articulating it and insufficient opportunity to mediate much of it to students. Finally, practical knowledge lies outside the traditional domain of academic knowledge, and higher education has developed cultural norms which resist giving it status.

In certain professions, for example teaching and nursing, the increased stress on scientific knowledge in education settings has been accompanied by increasing scepticism in service settings. More knowledgeable students threaten the credibility of practitioners trained under the old system, who defend their expert status by interpreting practice in terms of practical tasks at which students are bound to be less proficient.

3.2 Research methodology

We chose to adopt an extremely broad definition of mediation, and record any overt attempt to link scientific knowledge with practice. Thus we included even the mention of a practice situation during a 'theory' lecture or a piece of scientific knowledge in a practice setting or during discussion of a practice situation.

The project had to observe teaching in both education and practice settings. Neither structured observation nor survey techniques were appropriate, because we were looking at a dimension of professional formation for which commonly accepted language is limited and ill-defined. Neither sender reports nor receiver reports, structured or not, were likely to yield the same depth of evidence as that obtained by combinations of qualitative methods. Hence we resolved to adopt a case study approach.

We began by conducting two major case studies – a midwifery programme with no shared learning with other students, and a large Diploma of Higher Education (DipHE) nursing programme where we studied the common foundation programme (CFP), the adult branch programme and the mental health branch programme. It was impossible to observe all teaching sessions for all three years of each programme; we therefore covered the whole programme in interviews and documentary analysis, but confined our observations of teaching to sessions where we expected major attention to be given to one of our six selected topics. Sometimes, we were disappointed, especially in Case Study 1 where the organisation of teaching was extremely flexible (though inconvenient for the researcher this was a significant strength of the programme of education).

In reviewing progress with our Steering Committee half-way through the project, we decided to follow a further midwifery case study, less ambitious in scope, and a microstudy focused on an innovative approach to teaching life sciences. We were also running a programme of education to train nursing and midwifery lecturers in research and evaluation methods relating to education programmes, and three projects from that programme have been included as further mini studies on teaching and knowledge use in the life sciences. The range of evidence in this report comprises the following:

Case Study 1 (Chapter 3.3): An integrated midwifery programme of education with no shared learning and close links with practice settings. It also has links with higher education but is located on a hospital site.

Case Study 2 (Chapter 3.4): A university-based midwifery programme with some shared learning with DipHE nursing students and links with three more distant practice areas.

Case Study 3 (Chapter 3.5): A large university-based DipHE programme with teaching on both university and hospital sites; CFP, adult branch and mental health branch were studied.

Mini Study 1 (Chapter 3.6): An innovative life science teaching programme on a DipHE programme different from that in case study 3.

Mini Study 2 (Chapter 3.6): The use of biological knowledge by DipHE students working on an adult surgical ward.

Mini Study 3 (Chapter 3.6): The CFP life sciences programme on a third DipHE programme of education.

Mini Study 4 (Chapter 3.6): The use of biological knowledge about respiration by recently qualified and more experienced nurses working with breathless clients in hospital settings.

Students' scientific knowledge was not formally tested, but we were given access in Case Studies 1 and 3 to examination papers and a selection of student answers to questions on the six project topics. Other evidence was obtained about the cumulative effect of mediation throughout the programmes by observing students engaged in practice-related discussions in education settings and observing and interviewing students in practice settings. In the midwifery studies we also conducted discussions with students based on case-specific scenarios in which they were asked to identify relevant areas of scientific knowledge then describe how it might be used in conjunction with other relevant knowledge.

The necessary permission was obtained from all settings to be studied; the project undertook that neither institutions, localities nor individuals would be identified. Another part of the institutional agreement was that the researchers should obtain the permission of all staff and students involved. Lecturers could also veto our attendance at a particular session; the only significant kind of teaching which remained unobserved was experiential groupwork in the mental health branch of Case Study 3, where it was felt that an observer would be too obtrusive.

On a few occasions researchers felt their presence was significantly affecting the nature of the teaching (one is reported in Case Study 2); we regularly checked with students that the teaching we had just observed had not been atypical. Even if our presence did have a small effect, it would have been in the direction of giving more than usual attention to mediation and knowledge use; and allowing for such an effort would strengthen rather than weaken our conclusions.

Given that our case studies were restricted to only three sites (seven including the mini studies), we were anxious to establish that they described common though not necessarily universal forms of practice. We specifically questioned three focus groups (Chapter 4) about this. Nobody thought that our case studies were unrepresentative of pre-registration programmes in general, and the kinds of teaching we described were recognised as very familiar. It should be noted that the project was never seeking to draw programme-specific conclusions, but to evaluate the contribution of scientific knowledge and ascertain how it could be improved in more generic terms.

3.3 Case Study 1: a pre-registration diploma programme in midwifery

Case Study 1 covered a pre-registration diploma programme of education in midwifery located in a college of health studies linked to a new university. The majority of lectures are held on the hospital site where the students and the midwife lecturers are based and where students gain their clinical experience in all areas apart from mental health; the remaining lectures are held at the university.

Research methods

Observation of teaching and learning in both classroom and practice settings took place from September 1993 to May 1994; 36 hours of teaching were observed in the classroom and 20 hours of clinical practice during midwifery placements. Individual and group interviews were held with lecturers (midwifery and non-midwifery), mentors and student midwives; in total, 12 lecturers, 6 mentors and 3 groups of students participated in the project.

Access was given to curriculum documents, three sets of examination papers on biological sciences and one set of assessed case studies. A scenario exercise to test use of knowledge in practice was conducted with two groups of students.

Curriculum overview

The documentation describes the course as based on a 'patchwork model'. This was chosen to allow both 'a product and process approach' to students' education. The 'product' refers to the fact that a midwife must be safe to practise within the statutory framework governed by the United Kingdom Central Council Midwives' Rules. The 'process' refers to the development of self-awareness, self-assessment and an interest in continuing education. The model describes the course in terms of six inter-related core learning areas shown in Figure 9.

Midwifery skills:	practical aspects of the midwife's role
Professional skills:	statutory control and responsibilities of the midwife; professionalism
Health studies:	health education and promotion; maternal, fetal and neonatal well-being
Biological studies:	anatomy and physiology; embryology
Social sciences:	sociological, psychological and philosophical issues
Social policy:	health and welfare, policy and political issues

Figure 9: Core learning areas of the programme

Each area is subdivided into three to give a total of 18 patches of fundamental knowledge and skills; these are integrated with a strong grounding of clinical experience. The patches are arranged so that learning develops in a radial and spiral fashion, and is enhanced by negotiated learning areas towards the end of the course to meet individual students' needs and encourage self-directed learning.

The programme's three years are divided into four terms, three reflecting the academic year and the fourth the professional aspect of the programme. Time spent in clinical areas increases so the ratio of theory to practice changes from 3:2 at the beginning to 1:4 by the end. The Board and the university validate the programme and monitor assessment.

The midwife lecturers construct the curriculum then discuss with the liaison lecturer from the university what input is required from that site and who would be the appropriate lecturer. The majority of teaching is done by the midwifery lecturers and their emphasis is on holistic care.

The aim is that in the first year, students progress from **dependent observers** to **assisted practitioners**; learning concentrates on the healthy woman, baby and family, and experience is gained in hospital and community settings. In the second year, students should progress to **supervised practitioners**, extend their learning to include aspects of abnormal midwifery and attend the first non-midwifery placement – paediatric and surgical care. In the third year, students should progress to **independent practitioners**; they are prepared for professional practice and get experience in medical and psychiatric care. Supervision is gradually reduced as students gain confidence and competence.

Formative and summative assessment take place continually in all areas of learning to ensure each student has made progress. The only formal examination is an unseen paper in biological sciences at the end of year 1. Students must pass in both theoretical and clinical assessments. The link midwife/nurse produces a written assessment at the end of each practice placement.

Mentorship

During practice placements, each student is allocated two link midwives/nurses who act as role models initially, then as supervisors, advisors and supporters (mentors); they also assess the student's clinical skills and competence. This appears to work well in the community setting where working in a one-to-one situation with the student on a regular basis is simple to organise, but students complain that assessment is somewhat haphazard and rushed, with the result that it is not always helpful nor meaningful. One student reported:

> *'Chatting about assessment points in the car between visits, with the midwife writing up the form when we stop at traffic lights.'*

Linking the student with the link midwife in the hospital setting is difficult to arrange; in reality, students are assessed by the midwife they work with each day. They are responsible for linking with their own midwife at the end of each placement to discuss progress and needs, if they have been unable to work together.

The planning of teaching

The team of midwifery lecturers decide what to include in the teaching of a particular topic, how it should be taught and how much time needs to be allocated. However, because each group of students is different, each lecturer then decides how to deal with the topic according to the needs and ability of that group. The minimum educational requirement for admission to the programme is a pass in the DC test, but students may have 'A' levels or degrees. A group of mixed ability can cause difficulties in where to pitch teaching, and lecturers feel anxious about allowing students with previous knowledge to opt out of certain sessions: the Board has strict guidelines on the number of hours of theory students require, while having 'A' level biology does not necessarily mean the student will be able to apply that knowledge to midwifery practice and theory.

Planning the amount of detail to be included on a topic is difficult; lecturers talk about teaching at 'diploma level', but many find it difficult to decide when 'diploma' becomes 'degree'. Some midwifery lecturers teach at the level they experienced on the Advanced Diploma of Midwifery; if they have limited knowledge on a subject, they seek specialist help at the university, then prepare a follow-up session to help students apply the lecture to midwifery practice.

Midwifery and non-midwifery lecturers agree that there is insufficient time to teach some subjects in enough depth. The university lecturers in biological sciences believe the problem lies with the entry requirements and that the minimum requirement for admission to this course should be 'O' level biology (sic). With mixed ability groups, teaching needs to be done slowly and at a low level, to enable the students with no biological knowledge to participate. Often these students have difficulty understanding terms used.

Some students remarked on how unhelpful it was to be told that 'you would have covered this in school':

> *'It is frightening to realise how quickly you forget things. When I was at school, I was shocked that my parents did not know the digestive enzymes. Now I don't know them and it is only six years since I left. You cannot remember everything. I suppose you forget the bits you don't use.'*

Lecturers are conscious that students need at least an introduction to most topics as early as possible. The present arrangement is to begin with embryology and progress to the fetus, neonate, child and on to the fully developed systems of the adult. Some students say they find it difficult and there was evidence of this during the lecture on fetal circulation; comparisons were made between fetal and adult circulation although this had not yet been taught. The students could not visualise the direction of blood flow or even the structure of the heart. One student remarked:

> *'When we examined a real placenta, it was so much easier for me to understand its structure and function.'*

Midwifery lecturers state that they have to repeat some sessions covered by specialist lecturers in the biological sciences because students have not understood them or appreciated their relevance. Students feel that it would help to be given some pre-course reading so that they would come better prepared and be familiar with at least some of the common terms used.

Shared learning with DipHE nursing students has not yet been introduced. The midwifery lecturers believe learning is facilitated when groups are small, allowing interaction to take place. Currently, each set comprises 10 student midwives; lecturers feel that to integrate that group into a large group of 80 student nurses would not be conducive to learning nor allow for the application of the knowledge to midwifery; they accept that it could be more cost effective to combine the groups where the topic is appropriate to both, but feel that advantage would not outweigh the many disadvantages. In September 1994, the college will be moving its links to another university and modularisation will be introduced, which may make shared learning more feasible and practical.

The timetable is very fluid so that planned sessions can be postponed if the need arises to allow for discussion on clinical issues that students have recently met. Both students and lecturers bring newspaper articles and journal cuttings to display on the notice boards: for example, when two midwives were disciplined for their involvement at a water birth contrary to the policy of their employer, a session was held to discuss the ethical and legal issues involved.

Methods and styles of teaching and learning

Various teaching and learning methods are used; most of these were observed:

Lecture The majority of lectures observed were led by midwifery lecturers. Each group has its own lecturer so a good rapport develops and there is no inhibition about asking questions or relating personal experience. This is encouraged, with the lecturer giving instances of her experience to illustrate the lecture if nothing is forthcoming from the students, particularly with junior students, whose clinical experience is limited.

Anatomy and physiology lectures usually have two phases. Sessions usually begin with the anatomy of the organs, delivered directly with limited interaction between lecturer and students. During the physiology which follows, reference is often made to practical situations, as described in Observation 1.

Observation 1: A lecture on the renal system

This lecture had been preceded the previous week by a session on development of the renal system in the embryo and would be followed in three months by a specialist lecture. As the lecture progressed through the structure of the kidneys, the students were engrossed, but struggled to write everything verbatim from the overhead projector. They had difficulty just copying the spelling of certain words – e.g. fascia, papillae, calyx – without attempting to understand their function or significance. One student commented:

'I don't think any of this will be of any help to me in my practice.'

The lecturer moved on to physiology and applied this whenever possible to midwifery practice. For example, she explained the process of urine formation and re absorption and discussed the lowered renal threshold in pregnancy which allows glucose to filter through resulting in the glycosuria in pregnancy. At the end of the lecture, the same student said:

'I have changed my mind. It is relevant to what I will be doing – testing urine anyway. Maybe it will become even more significant as time goes on.'

Some lectures by specialists are delivered without participation from the students. The success of this seems to depend on the lecturer and the students' interest in the subject. A one hour lecture on neonatal renal problems, given by a paediatric nephrologist comprised a lot of information on abnormalities, diagnosis and treatment delivered quickly with the use of a large number of slides. The students gave their complete attention, took detailed notes and appeared to have no difficulty in following the session. Their next practice placement was to be the neonatal unit and paediatric ward, so they believed the lecture was relevant to their training.

University-based lecturers did not often initiate participation, but responded positively when students interrupted. The small size of group allowed students to do this when they were involved with the subject, so student interest led to prolonged interaction. However, when the relevance to midwifery practice was not immediately evident, attention would drift, note taking would diminish and no questions would be asked. Thus students did experience difficulty with some of the lectures on health studies which included health education, promotion and provision.

Seminar Students are encouraged to draw on each other's past experiences so that knowledge is shared. It is recognised that they come to the course with different life experiences which may be good resources for learning. For example, one student – a breast feeding counsellor – was asked to lead a seminar on breast feeding. Those with no experience often chatted to her about specific feeding problems in their practice placements; one had discussed a problem with her the previous week and reported back:

> *'I visited that mother and baby again yesterday and tried positioning the baby differently as you had suggested. She turned the baby round holding it like a rugby ball and it worked. The baby fixed straightaway.'*

The students take turns to lead seminars. The topic may be of their own choosing or it may be requested by another student or by the lecturer.

Clinical session The midwifery education department is situated in the same block as the maternity wards. Teaching sessions are often preceded or followed by visits to the clinical areas, and constant reference is made to these visits while the theory or points of care are discussed in class. Observation 2 describes part of a discussion between a lecturer and students on thermoregulation. The lecturer encouraged the students to question and produce answers by linking the theory to observations made the previous day on a visit to the neonatal unit.

Observation 2: Part of a discussion on thermoregulation

Lecturer: *'How do babies lose heat and what can we do to reduce the amount of heat loss? Think of the babies you saw yesterday, how and where they were being cared for in relation to thermoregulation. Why was baby X dressed but baby Y not?'*

Student: *'The air around the baby needs to be warm, so they are nursed in incubators if they are preterm or sick because it is easier to regulate the temperature then. Also the baby can be nursed naked so it can be observed.'*

The discussion continued on methods of heat loss with reference made to examples in the unit. The use of the fan within the incubator seemed to cause the students some confusion – the aim being to circulate warm air, but the disadvantage being that it can result in cooling if it is running too quickly. Since the group appeared to struggle with the concept of the function of an incubator, the lecturer decided to visit the unit again so that she could dismantle one and demonstrate how it works.

Observation in a clinical area preceding or following a teaching session in the classroom occurs frequently at the beginning of the first year when the students' practical experience is minimal. Observation 3 is an example of this.

Observation 3: Introductory session on postnatal care

The session covered the aims and objectives of postnatal care, the midwife's role, the main needs of the mother and baby at this time and how these can be met. Reference was made to the Midwife's Rules and Code of Practice and a short reading list was distributed. Students were asked questions relating to what they had observed while accompanying the community midwife as she cared for mothers during the postnatal period and they were encouraged to comment or clarify any query.

They then went on to a postnatal ward where they were divided into small groups to observe a mother and baby being examined by the lecturer or one of the ward midwives. On return to the classroom, they discussed what they had observed and summarised the main points of care – physical, psychological and social.

Game At the end of term as a form of light relief, a game is sometimes used as an alternative method of learning. An example of this is a board game called 'Minefield', which tests students' knowledge of the Midwives' Rules and Code of Practice. Students work in pairs, throwing the dice, answering questions and dealing with pitfalls they encounter as they move round the board from the beginning (first day as a newly qualified midwife) to the end (arrival at their retirement cottage in the country). As they progress, they receive talents for correct answers and return talents if they get it wrong. The winner is the pair with the most talents when they retire.

Much discussion took place between the students and lecturer as the answers were given; and often the lecturer illustrated points with actual situations in which they were likely to find themselves. They enjoyed the session and found it an ideal way to learn, reinforce the learning and apply the rules to practice.

Reflection on practice When students return to college following a week in practice placement, they are given an opportunity to relate their experiences to the group. They use this session to express difficulties in understanding or anxieties in the provision of care, to question policy and management and share their learning. The midwife lecturer is available throughout the day to meet students who need further discussion, support or clarification; students take up this opportunity frequently, and also meet her while on practice placements if they need to discuss specific issues related to their practice.

Observation 4: Part of an individual tutorial

One student was anxious and upset about a situation she had been involved in on the labour ward. The baby was asphyxiated at birth and required resuscitation and ventilation. Labour had been normal with no signs of fetal distress, apart from one episode of meconium stained liquor. There had been no evidence of meconium at delivery, so how could the baby have aspirated meconium and been asphyxiated? A discussion followed on fetal distress; the possibility of the baby gasping before birth; the identification of meconium in the liquor, and management of the baby at birth to prevent aspiration. Throughout the discussion, the lecturer allowed the student time to question, consider the answer and talk through her feelings.

As an alternative approach to 'reflection on practice', one group of students nearing the end of their second year decided that each week, one of them should present a short study on the care she had given a mother or baby, since they had begun to feel they were not benefiting from listening to each other's experiences every week in class. They believed that such presentations would be helpful to everyone. As the student presented it, she questioned aspects of care, shared knowledge she had acquired from participating in that care and answered any questions she could. The rest of the group, including the lecturer, participated in both the questions and the answers; an example is given in Observation 5.

Observation 5: A student-presented case study

The presentation focused on the care of a baby born by caesarean section at 30 weeks gestation. The student described the care given, her involvement and the problems the baby had experienced as a result of immaturity.

'Looking after this baby has made me realise what a barrier an incubator is. Interaction between mother and baby is difficult, especially since neither is well.'

This opened up a discussion on the feasibility of nursing mothers and sick babies together; communication between midwifery and neonatal staff; keeping parents well informed.

The baby had developed an umbilical infection which was being treated with gentamycin, and one of the group questioned the dangers of using that drug. The lecturer explained how the levels of gentamycin are measured and reminded students of the importance of treating infection in that area by asking them to consider the structures leading from the umbilical cord.

This learning exercise will continue while the students find it helpful, but may be adapted or discontinued to suit their needs. The idea was also discussed at a staff meeting so it could be adopted by others if they felt it had benefits. It was noted that it would only be appropriate to groups of students who had sufficient knowledge and practical experience to give such a presentation.

Journals These were unpopular with students and therefore were inadequately completed and of little benefit, since they found writing them a time-consuming and unhelpful chore. However, the lecturer who taught neonatal subjects gave them priority, suggesting her group start a journal for their placement in the neonatal unit. This worked well for the majority of the students – possibly because it was for a limited time and on a specific area where they were nursing sick babies, as opposed to well mothers.

Clinical observation The situations observed varied between totally supervised practice, where a qualified midwife or neonatal nurse constantly worked alongside the student, to practice where the student provided care on her own and a midwife was available to answer queries. The students said this happens at any stage of their training, often because there are insufficient trained staff to work with them. Although they appreciate being given responsibility, students also feel anxious about giving inadequate care due to lack of knowledge and skills. One student said:

> *'It does give us experience and confidence. Sometimes it is difficult to learn if someone is there all the time telling us what to do. It's a bit scary, though. What if we miss something or give the wrong advice?'*

In the neonatal unit, observations were made on students caring for low birth weight and sick babies in incubators under the close supervision of nurses qualified to care for the sick neonate. The unit was quiet so the environment was conducive to teaching and learning. One of the nurses said:

> *'I am not so far away from training myself that I have forgotten what it is like to be frightened of monitors and very small babies. I can relate to the students and support them as well as teach them.'*

One student was helping to care for a baby born at 31 weeks gestation, whose method of feeding was total parenteral nutrition (TPN). The student was asked if the lecture on this method had been helpful in her practice. She said:

> *'The lecture was a bit difficult for me. Lots of facts and figures. I have learned about TPN by writing a case history on a baby having it. I read up about it and related it to the baby. I don't think I would have*

> *understood it otherwise. If I am taught something but never come across it in practice, I forget it very quickly even if I understood it at the time.'*

Another student assisted a mother to breast feed her baby. She talked to the researcher afterwards about the mechanics of fixing a baby to the breast and the knowledge a midwife needs regarding the anatomy of the breast and physiology of lactation. A nurse interested in the discussion produced a worksheet she had completed before attending a breast feeding workshop. The student midwife found the worksheet helpful:

> *'I think these are an excellent way of learning and revising, much better than reading a textbook.'*

One of the students questioned the consultant paediatrician on a ward round when it was suggested that a preterm baby should be given albumin.

> *'What does the albumin do? Will it expand the plasma?'*

> *'Yes. It will prevent hypovolaemia and hypotension and improve the baby's circulation. Hypoalbuminaemia results in fluid retention due to fluid seeping into the extra cellular tissues.'*

Some consultants find the students' approach disturbing. Being questioned by a student midwife is a new phenomenon, but most have no problem with this and believe that midwifery training has improved considerably in recent years.

In another situation, a student worked alongside a midwife providing care for a group of antenatal and postnatal women and their babies. In each case, the examination was done by the student and checked by the midwife. The student asked questions and the midwife answered, although not always in great detail. For example, the midwife noted that an antenatal woman had a sample of blood taken the previous day for urea and electrolytes measurement, and said:

> *'We had better get these results before the doctors come round.'*

> *'Why did she have that done? Is it to check the function of the kidneys?'*

> *'She's got hypertension.'*

No explanation of the relevance of this statement was given and it was not questioned by the student. The same student experienced a lot of difficulty recording blood pressure, and on each occasion, asked the midwife to check it:

> *'It sounds very muffled. Must be my ears.'*

The midwife checked the stethoscope and reapplied the cuff to the woman's arm but offered no explanation, then said:

> *'Take your time, make sure you are comfortable as well as the client. It is difficult to concentrate if you are rushing or tense. This one is quiet though, more difficult to hear than the last one.'*

The student reflected afterwards on how she learns in the practical situation. She said that some midwives are very helpful; they supervise, teach and question the students.

> *'That's good because it makes me think why I am doing something. I forget to do that myself, I am so busy concentrating on the task I have been told to do. But others just want me to get on with it. They don't seem to like me asking questions and say that it is not relevant. The problem is, I don't know what is and isn't relevant at the moment.'*

Topics are taught in several ways in the classroom. Some are given a designated slot in the timetable and taught only once; some are initially introduced, then repeated with more detail as students gain experience and can apply the knowledge to practice; some are not identified as separate subjects but are referred to constantly both in classroom and clinical teaching settings.

None of the students found any difficulty integrating topics rather than having them taught in isolation, but some did express anxiety about the fact that they are often not aware of how much more there is to learn on a particular topic. They realise they cannot learn everything at one sitting but experience frustration when given only a tasting, rather than the whole story.

Pain The pain experienced by a woman in labour is a major issue, so much emphasis is put on this topic – the physiology and nature of pain, coping mechanisms, pain relieving methods, normal progress of labour, ability to recognise deviations from normal. Lectures on post-operative pain, perineal pain, pain caused by invasive procedures to both mother and neonate and the pain caused by such abnormalities as concealed ante-partum haemorrhage and ectopic pregnancy are also included in the curriculum; and the topic infiltrates many other episodes relating to the child-bearing woman and her newborn baby.

Midwife lecturers, neonatal nurses, anaesthetists, biologists, psychologists and physiotherapists are all involved in teaching pain. Students are aware of its relevance from the beginning of the course and appear able to apply it to practice as they gain experience in caring for women in different situations.

Observation 6: Pain in the neonate

A lecture on pain in the neonate was given to a group of second year students by a staff nurse who has worked in neonatal care for many years. She described the behavioural responses of a baby experiencing pain and showed slides of facial expression, body movements and discussed the 'silent cry' of a ventilated baby. She then went on to describe physiological responses, stressors within a neonatal unit and the management of pain. She showed the students how to do a 'motionless hold' to comfort a sick baby who should be handled minimally.

Later that week, the group visited the neonatal unit with the lecturer to observe babies nursed in incubators. The monitoring of the heart, oxygen levels, the babies' expressions in relation to tests being carried out were all discussed. The different response to painful procedures of a baby who is suffering chronic pain was noted – 'frozen watchfulness'. The advantages and disadvantages of touch to the sick neonate were discussed when they saw a nurse using the motionless hold on a preterm sick baby.

One of the examination papers on biological sciences included a question on pain in labour:

> *'Discuss the physiology and function of pain in labour. How can the midwife and the woman decide the most suitable method of pain relief?'*

The question was answered by 55% of the group, and marks ranged from 30-65%. The paper was marked by a midwife lecturer and the biologist responsible for teaching that subject. One examiner commented that the second half of the question, which referred to the care of the woman experiencing pain in labour, was answered well; and that students' knowledge of the physiology and function of pain in general also appeared sound. However, this physiological knowledge was not applied to labour specifically so there was no evidence of linkage between the theory and practice.

Nutrition This topic occupies a major part of the curriculum, since it involves biological sciences – anatomy of gastro-intestinal tract, anatomy of breast and physiology of lactation; the nutritional needs in pregnancy and the special needs of different cultures, vegans and certain dietary disorders; nutrition in labour; constituents of breast and modified milks; nutritional needs of the well and sick neonate. Teaching is done by midwifery lecturers, clinical midwives, neonatal nurses, pharmacists, dietitians and university lecturers.

Because nutrition infiltrates the work of the midwife so frequently, it was referred to on many occasions during lectures and seminars focused on other issues. For example, during a session on infection of the neonate, the midwife lecturer discussed the problem of meeting the nutritional needs of the infected baby. The group considered specific problems such as the method of feeding a baby with gastro-enteritis; the complications which can arise if the baby suffers long-term illness; the advantages and disadvantages of enteral and parental feeding.

Three lectures were observed with nutrition as the central focus, two led by a university lecturer with a special interest in nutrition. The first focused on nutrition in general – food selection, food types, malnutrition and education, but made several references to child-bearing and needs in pregnancy and lactation. The lecturer did not invite the group to ask questions, nor did he question them, but they felt able to interrupt him when necessary. For example, when the giving of iron supplements routinely to all women in pregnancy was questioned, a discussion followed on the extra needs compensated by the increased absorption which occurs in pregnancy; the potential harm of giving supplements to everyone and the cost of doing so.

The second lecture, by the same lecturer, focused on nutrition specifically related to child-bearing. More interaction between the group and the lecturer took place; when discussing the implications of an inadequate diet; for example, a student questioned its effects on the production of breast milk. The composition of breast, modified and unmodified milks were discussed and the advantages and disadvantages of each to the baby. The characteristics of good weaning food and comparisons between the available foods in the UK and third world countries were included.

The third lecture, which focused on TPN for the neonate, was given by the hospital pharmacist. None of the students had seen TPN used for a baby, since they had not yet spent any time in the special care baby unit. A lot of information was given in a short time, the lecturer using slides to illustrate the talk, and a video on the administration techniques for students to watch later. The whole topic related to the sick newborn – nutritional needs, reasons for choosing TPN, risks, composition of the feed and monitoring of the baby; no interaction took place between lecturer and students. Several weeks later, the researcher present at that lecture observed a student caring for a preterm baby being fed by TPN. Asked how she had gained the knowledge to enable her to care for this baby in relation to nutrition, the student talked about working alongside the neonatal nurse, listening to the paediatricians and reading about TPN so she could produce a case study on this baby; no mention was made of the lecture. When questioned about this, she admitted that she had forgotten about it. She said the lecture had been difficult to follow at the time because she had no knowledge and could not apply the information to practice, and suggested she would appreciate the same lecture better now that she had cared for a baby who required TPN.

In other clinical observation sessions, students worked on a one-to-one basis with qualified midwives as they examined the breasts of postnatal mothers, gave advice on whether to breast or bottle feed, and assisted mothers to fix the baby on the breast. The midwives taught and advised the mothers, but did not teach or question the students to ensure they understood. During discussion at the end of the period, the students stated that this was normal practice, since there was no time to include formal teaching during the daily routine of postnatal care. They believed they did learn by being with the midwife and the mother, listening and observing, and often there would be an opportunity to ask questions later. Some midwives were more receptive than others; many gave the impression that they felt students wanted to know more than was necessary and considered their questions irrelevant.

Nutrition appeared in all three examination papers on biological sciences seen by the researcher. One example was:

> *'Describe the anatomy of the breast and the physiological changes which take place during pregnancy and the puerperium, stating how this knowledge can be used by the midwife to help the mother succeed in breast-feeding.'*

The question was answered by 75% of the students, and marks ranged from 65-80%. A lot of detail was given on the structure of the breast – both macro and micro – with the use of diagrams; also the influence of hormones, the physiology of lactation and the mechanics of breast feeding.

Shock This is not taught as a separate subject, yet all students were aware of its seriousness. Emphasis was on prevention of shock and of the predisposing factors. This was repeated time and time again as complications of pregnancy, labour and the puerperium were taught. One student stated:

> *'Our practice is towards prevention and ensuring that the woman is in optimum health. For example, we need to know that a woman needs some nutrition in labour to prevent dehydration, hypoglycaemia and ketosis. These could cause prolonged labour which in turn could cause post-partum haemorrhage which in turn could cause shock.'*

Shock was not highlighted as a specific question in the examination papers but its prevention was expected to be included in the answers to certain relevant questions, such as:

> *'Discuss the management by the midwife of the third stage of labour with reference to the physiological changes which occur during this stage in the light of recent research and developments.'*

Prevention of the predisposing factors which could lead to post-partum and haemorrhage and progress to hypovolaemic shock was seen to be an essential part of this answer. The question was answered by 75% of the students and the marks ranged from 45-75%.

Stress This topic was dealt with in relation to stress experienced by students as well as by clients. Within the college, a nurse lecturer holds regular group sessions with all students to allow them to air their fears, frustrations and problems with an unbiased listener. Students found this facility helpful, and felt they learned the art of dealing with someone suffering from stress (client or colleague) as well as benefiting from unburdening their troubles; this lecturer is invited to meet the students when the midwifery lecturer feels there is a need.

Signs of stress were discussed during a psychology session and examples given of situations where these may be manifested. Although no information is verbally given to the woman, she may pick up non-verbal clues and become stressed through lack of communication. The lecturer described a typical scenario in a busy antenatal clinic:

> *'A woman has had to rush to be on time for her appointment. She arrives late and flustered but is left waiting because everything is running behind time. As time passes, she begins to worry about getting back to collect the children from school. By the time she is examined, her blood pressure and pulse rate are elevated and her palms are sweating.'*

A discussion followed on the stressors women in their care may be experiencing, how to prevent or lessen their effects, the importance of communication and giving good information.

During a social policy lecture, recession, unemployment, poor nutrition and the resultant stress suffered by all the family were discussed. Stress was not included in any of the three examination papers.

Self-esteem During psychology sessions, the issue of self-awareness and development, the concept of self-image and how this is altered by child-bearing and motherhood were discussed. Women's role in society, the impact of pregnancy, surgery, hospitalisation and illness were included in the sessions led by the social policy lecturer. The publication of two recent government reports – Winterton and Cumberledge – has raised awareness of women's rights to individual choice and control in childbirth, so these issues were discussed frequently during sessions on communication skills, birth plans, place of birth, empowerment of women and women with special needs.

The midwife's own self-esteem was discussed by the social scientist, who emphasised the importance of education not just on midwifery subjects but also generally and the reason for including certain topics in their training:

> *'This course is all about education. Although midwifery is a profession, it has always been under the shadow of the doctors, who are better educated. If you want to argue your case and be involved in policy making you need to be confident. Education raises confidence.'*

She went on to argue that confidence raises self-esteem which in turn assists the midwife to empower the women and raise their self-esteem.

Fluids, electrolytes and renal function These topics were given central focus in three lectures observed and a further three identified on the timetable. They were also discussed as appropriate during other teaching sessions for example, hypertensive disease, vomiting in pregnancy and the sick newborn.

The students were taught normal levels and ranges and the interpretation of results, but the impression received was that this topic was not given the same weight as the others, probably because it strayed from midwifery care into the realms of the obstetrician or even the physician. The midwife's role comprises the care of a woman in normal pregnancy, labour and the puerperium; the care of the newborn baby; the detection of abnormal conditions and the procurement of medical assistance when necessary. This topic was not included in any of the three examination papers.

Views of lecturers and mentors

Link midwives and nurses are encouraged to obtain the ENB 998/7 course and attend workshops to discuss mentorship, the aims of the course and students' learning needs. The workshops are run regularly by the midwifery lecturers, but are often poorly attended. It is thought that this is due not just to high workloads making release for study time difficult, but also to fear or lack of motivation; some midwives appear to be able to attend all the sessions while others appear to be unable to attend any.

Although the midwives have accepted that the midwifery course at diploma level is here to stay, some are still sceptical of the benefits. Some are convinced that clinical skills are more important than a vast amount of theoretical knowledge, and that this learning must take place with the woman, not in the classroom. Some gave examples of learning through experience of caring for women in different situations once they had qualified as midwives:

> *'I feel I have enough knowledge about pain in labour and I also believe I can apply that knowledge to practice, but that is not enough. Experience is very necessary because every woman copes with pain differently so you need to be with women in labour to understand this.'*

This midwife felt anxious that students are not getting enough practical experience and are less prepared to practise on qualification than they used to be. Sometimes there appears to be a discrepancy between what lecturers think should be taught by mentors and what mentors think should already have been taught by lecturers.

The lecturers accept that students may come to the programme with a different attitude to post-registration students; they have no experience of hospital protocol, politics or policies, and come with the belief that they will gain the knowledge, confidence and skills to enable them to improve the care for pregnant women. They are encouraged to take responsibility for their own learning and to question and use anyone who has the relevant knowledge to facilitate that learning. The lecturers are aware that this may not be acceptable to some members of staff, but believe that with time, it will become normal practice. One lecturer said that this is discussed on the mentors' workshops.

> *'Midwives need to understand that teaching a skill without giving an explanation with it is inadequate. For example, demonstrating how to record a baby's temperature needs to be accompanied by certain aspects of knowledge, such as why axilla and not rectum?'*

Some lecturers, however, believe it is possible for a midwife to be a good practitioner and yet not have the teaching skills nor the time to explain every aspect of her practice. When that is the case, the student is encouraged to observe closely, reflect on what she saw and discuss it at a more appropriate time or, if necessary, with another midwife.

Testing students' knowledge

Two groups of students (first and second years) participated in an exercise to determine whether they could apply knowledge gained in the classroom to a practical situation. They were given a scenario describing a typical clinical situation in relation to one of the six topics of the project, and asked to consider how they would deal with this problem in practice; identify 10-15 keywords or phrases relating to biological/psychological/sociological knowledge which enabled them to assess and respond to the situation, and produce a concept map by linking the keywords and explain the linkages.

One scenario was first discussed with the group and keywords identified. The students working in groups of two or three, were given approximately 30 minutes to complete the exercise and their discussions were recorded on audio tape. This did not work as well as the example discussed by the researcher, since the reasons behind the linkage of the words were not often questioned and therefore the knowledge did not become apparent.

The topics which had been given more time and emphasis on the curriculum, such as pain and nutrition, were dealt with better than the others. Both groups had no difficulty dealing with the situation nor using specific biological knowledge to justify their actions. They were surprised at how much knowledge they had relating to just one topic and were reassured by doing the exercise and making the links. Other topics, such as shock, and fluids and electrolytes were found to be more difficult because many students had not met the situation in practice. Stress and self-esteem were tackled as well by the first year students as the second. This appeared to owe more to the students' past experience than to knowledge gained during the course. They had difficulty identifying where, when and if they had been taught these topics – some believed they had been included in some psychology or sociology sessions but not as the main subject. 'I can't remember not knowing that' – remarked one student, trying to identify the source of knowledge relating to stress, while another stated that 'we get taught lots of models and concepts, but I can't remember any of them. It's all common sense really.'

Summary

Each cohort is small (10 students) with its own personal lecturer who provides continuity throughout the three years. A good relationship develops quickly between the group and the lecturer and among the individual students, which encourages the sharing of knowledge, interaction in class and peer support. The midwifery education department is within the same building as the maternity wards, enabling the lecturers to link with their colleagues in practice and integrate theory with practical sessions as appropriate.

A vast amount of mediation takes place – during lectures; in the clinical areas by lecturers, midwives, doctors, nurses and the women themselves; between students as they prepare seminars, lead workshops and spend time together during self-directed study.

The timetable is flexible and can change from hour to hour, allowing students to discuss issues relevant to their present clinical area or to a current news item.

A problem identified by lecturers was the lack of time available to teach certain topics, especially in the biological sciences. The fact that some students came to the course with more educational qualifications than others caused difficulty in teaching at an appropriate level. Although it was felt that 'diploma level' should be taught from the beginning, this was not always possible because of students' lack of knowledge. It was impossible to elicit, however, what would be added to the syllabus if more time was allowed or if the topic could be taught in less time because of students' prior knowledge.

Students agreed that they had difficulty understanding issues when they had no prior knowledge of the subject, and suggested that pre-course reading and preparation relating to basic biology would be helpful so that they were at least familiar with common terms. They also highlighted that in some instances it is easier to learn a subject once they have had an insight into the practical application, and questioned whether it may sometimes be better to precede theory with practice.

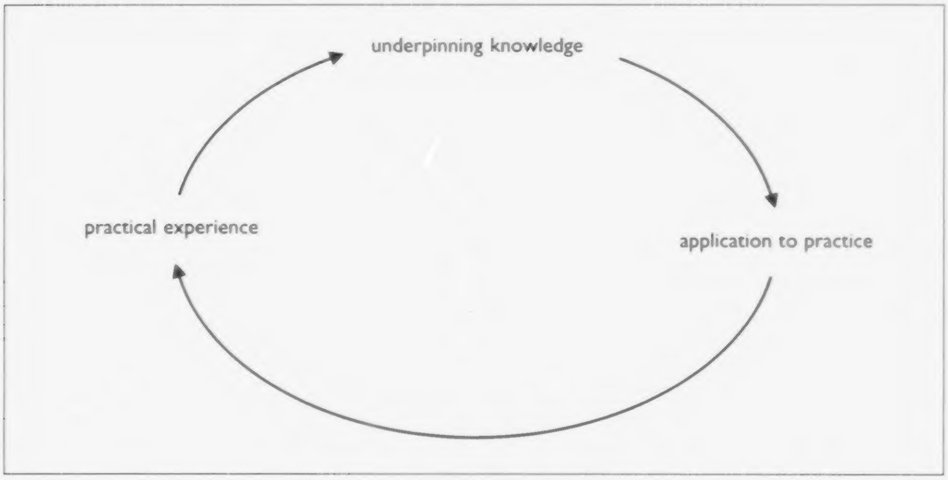
From the examination papers studied, questions relating to the biological sciences which were not specifically applied to practice were not popular, and often not attempted by any students. The more relevant the question appeared to be to practice, the more likely it was to be answered.

Although students agreed with the principle of holistic care, they believed that learning some basic tasks in the classroom before they venture into the clinical areas would boost their confidence and strengthen their relationship with qualified staff and the women. They gave examples of opening sterile packs, putting on gloves and dressing for the operating theatre.

Many students had identified a gap between the philosophy of care taught in the classroom (woman centred, autonomous midwife) and what is experienced in practice (power of the obstetricians, interventions, policies). Although they believed their teaching should prepare them for the midwife's role, they felt anxious that they would find difficulty putting that preparation into practice due to the constraints within some clinical areas.

Comments from some mentors gave the impression that they are not yet convinced that the pre-registration programme prepares the student adequately for the role of the midwife. They believe that too much emphasis is now placed on theoretical concepts over clinical skills.

Despite the mediation and constant references to practice within teaching sessions, students still have difficulty in relating certain topics to clinical practice or remembering any aspect of a lecture unless the knowledge has been reinforced in a live situation. They appreciate the importance of practical experience in their learning process and believe that it completes the learning cycle:



3.4 Case Study 2: a second pre-registration diploma programme in midwifery

Introduction

Case Study 2 is located in an institute of health within a new university. The annual intake of pre-registration diploma student midwives is 16 students. Clinical experience is gained in three maternity units within a 60 mile radius, while lectures are held at the institute.

Research methods

Twenty hours of observation of teaching and learning took place within this university from May to September 1994 in order to gather evidence on the application of knowledge to midwifery practice.

Individual and group interviews were held with lecturers and first and second year students; in total, seven lecturers and two groups of students participated in the project. The researcher also met students and lecturers informally on several occasions following teaching sessions. Programme documents were studied, and a scenario exercise to test knowledge use in practice was conducted with one group of students. Time did not permit observation to be carried out in any of the clinical areas, and information on clinical teaching and learning was gained only by interviewing students and midwifery lecturers.

Curriculum overview

The programme is on a semester basis, the first three semesters comprising a common core programme and the second three a midwifery care programme. Each semester includes learning in theoretical and practical situations. It is based on a spiral curriculum model with five main themes, listed in Figure 10.

1. **Biological sciences** – anatomy, physiology, microbiology, pharmacology, pathology
2. **Behavioural and social sciences** – psychology, sociology, social psychology
3. **Professional studies** – midwifery theory, obstetrics and neonatology
4. **Strategies for study, enquiry and research**
5. **Midwifery practice** – technical, communication and interpersonal skills

Figure 10: The main themes of the curriculum

Students receive a total of 2,300 hours in the education setting, including study time, and 2,300 hours clinical practice during the three year programme. The Board and the university are the validating bodies and monitor the assessment process.

The common core programme aims to give students an opportunity to appreciate the relevance of core subjects and their relationships to a variety of health care settings, so they can use this knowledge as a basis for professional practice. Two thirds is classroom-based and one third practice-based (initially two days per week in community settings, then two days per week within a maternity unit).

The midwifery practice programme aims to assist students to develop further competence in midwifery skills. One third is classroom-based and two thirds practice-based; students also spend 10 weeks in non-midwifery placements (surgical, medical and psychiatric), and gain insight into paediatric care by producing a case study observing a baby of their choice. They witness the baby's birth and then follow growth, development and integration into the family by visiting the home and studying progress throughout the three years of the programme.

The curriculum is planned by midwifery and non-midwifery lecturers, but in practice midwifery lecturers organise the timetable and book lecturers. Each set of students has a personal lecturer, responsible for administration as well as support and counselling. Some lectures in biological and social sciences are shared with DipHE nursing students.

Assessment

Continuing assessment, both formative and summative, takes place in all areas of learning to ensure students progress, although no summative assessment is made on purely biological sciences. The summative assessment comprises (1) a range of written assignments, (2) examinations in which students are expected to answer three out of five questions on topics which are published before the examination, and (3) a clinical assessment profile based on written mentor reports at the end of each practice placement. Students must achieve a pass in both 'theoretical' and clinical assessments.

Mentorship

During clinical practice, each student is allocated a mentor who acts as a role model, counsellor and assessor. The mentor is a qualified midwife with a minimum of one year's experience who has completed the ENB 997 course.

The university recommends that mentor and student work together for at least two shifts each week during the common core programme; students reported that this usually happened. Linking with mentors was more difficult in hospital settings during the midwifery care programme, but students did not feel it was so necessary at this stage. Throughout the three years, supervision is gradually reduced as students gain confidence and competence.

Various teaching and learning methods are in use throughout the programme:

Lectures During the common core programme, lectures in biological and social sciences are shared with DipHE nursing students; these were held in a tiered lecture theatre and the group comprised 80-90 students. One of the two lectures attended by the researcher is described in Observation 7.

Observation 7: Lecture on blood cell production

The midwifery students sat together at the front. The lecturer was soft spoken, and although he used slides, he discussed issues other than those he was displaying, so hearing as well as seeing the screen was essential. Everything written on the slides was copied by the students, but few attempted to follow his discussions or take other notes. Chatter and disturbance at the back of the hall made hearing and understanding difficult.

Many terms unfamiliar to the students appeared on the slides e.g. granulopoesis, but if they asked about their meaning or spelling they would be told *'Don't worry too much about all these fancy words.'* The lecturer also mentioned other terms new to the group but, since these were not written and the students could neither spell them nor understand them, they were not noted. As the lecture progressed, the students appeared to become less attentive, no further questions were asked and most stopped taking notes. Several references were made to pregnancy in relation to blood disorders, but if these were unfamiliar terms to the students they were not noted or understood.

The lecturer was a biologist who specialises in haematology. Following the lecture he talked to the researcher about the pre-registration programmes and shared learning. He felt that all common core subjects should be shared for several reasons: it is costly to repeat the sessions to small groups; it is not very stimulating for the lecturer to give the same lecture several times which means he becomes unmotivated and uncommitted to the students and their learning, and the majority of students begin the programme with little knowledge of the biological sciences.

The lecturer believed that key lectures should be given, then followed by seminars which facilitate the application of that knowledge to practice. These seminars should be student-led with no agenda set by the lecturer. Examples of clinical practice or problems could be discussed to encourage students to reflect on and analyse situations in which either they or their colleagues have been involved. The lecturer would facilitate.

The midwifery lecturers disagree with this view; they plan to opt out of the key lectures when they prepare their next submission document to the Board. The midwifery students appear to learn little from the lectures with the result that everything has to be repeated and there are no cost savings. This lack of understanding is blamed on group size and students' difficulty in linking theory to practice. The practicalities of arranging the timetable to coincide with DipHE lectures are also becoming restrictive and unmanageable.

According to the students, the key lectures are dull, hard to follow and difficult to relate to midwifery practice. References to nursing, let alone midwifery, are rare. One student said:

> *'Today was the best we have had. I could not work out why he was mentioning midwifery so often until I turned round and saw you were sitting there. I suppose he was trying to make a special effort.'*

They also find being part of a large, noisy group unsettling and explained that if they did not sit at the front they would be unable to hear or understand anything.

In contrast, lectures on psychology are given to the midwifery students on their own; the lecturer's background is in nursing, midwifery and health visiting, but she now teaches psychology. She believes that illustrating lectures with clinical examples, from the students' experience if possible, is essential to students' understanding and this is only practical in small groups. She also does seminar work when appropriate and asks students to complete worksheets and discuss case studies. She liaises closely with midwifery lecturers to update her own knowledge of current practice. Observation 8 relates to a lecture she gave to the students as one of a series.

Observation 8: Lecture on perception

The topic was perception and constant references were made to the midwife's practice; the lecturer asked questions and the students felt able to question and comment as appropriate. For example, the lecturer stated that one of the objectives of the session was:

'By the end, you will understand the nature of perception and link it to your practice. For example, if the perception of the labour is bad for a woman, what will the perception of her next pregnancy be? Do you think she will suffer from stress? What are the implications to the midwife?'

She elaborated on the role of the special senses and the need for midwives to consider this topic – the importance of having the ability to use one's senses and the problems which can occur if a woman has a disability e.g. deafness.

Seminars When the curriculum was constructed, it had been planned to hold link seminars with input from the psychologist, sociologist and biologist to encourage students to think across the boundaries of the disciplines. These have not been possible to organise so far.

One seminar observed was part of a series on law and ethics led by two lecturers – one midwifery and the other non-midwifery. The topic had been changed at the students' request; they wanted to discuss the implications of the document 'Changing Childbirth' after being given their first set of published topics, one of which was this document.

Observation 9: Seminar on child birth policy

The session began with a discussion on changes in the past 10-15 years relating to childbirth. Some students had given birth themselves in that era and were invited to share their feelings and experiences. The group was then given a summary of the document and asked to discuss it in groups and answer specific questions. The groups were chosen to ensure each had a mixture of students who were mothers and those who were not; the discussions tended to be led by the mothers. The students were asked to report on their discussions; lots of prompting by the lecturers was necessary. They were then given five short scenarios to consider in pairs and discuss with the whole group. The following was one example:

'A 28 year old mother expecting her second child, who has had no previous obstetric problems, requests a home delivery. The named midwife is in agreement, but the GP refuses. How should the midwife proceed in partnership with her client?'

The discussion sessions were not very lively, and the lecturers were disappointed that the controversial issues presented had not opened up a debate. Although the group had completed only six months of training, they reported that they had held similar sessions with other groups at the same stage and had much more interaction and discussion.

That morning, the same group had a teaching session on the third stage of labour from their personal lecturer, and again seemed apathetic – two were off sick and five arrived late. Of the 12 present, only four took notes, no questions were asked and only some answered questions put by the lecturer. The students were later asked by the researcher to give their views on the day. They stated that they had enjoyed the session on law and ethics and found it helpful, but they were tired and anxious about the first examination paper. They all agreed that

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the two days spent in the clinical areas every week were beneficial and rewarding but some theoretical sessions were difficult to understand and link to practice. One remarked:

> *'I know we need to know the basics, but why so much detail? The qualified midwives do not have this depth of knowledge and they seem to be good at their job.'*

> Another said:

> *'Maybe it will get easier when we have had more practical experience. I have only seen one birth so far and I didn't notice the placenta being delivered. It is difficult to learn all this biology when it is all new. I think we are expected to know too much.'*

Laboratory workshops Teaching sessions are held in the life sciences laboratory when practical examples need to be demonstrated during the common core programme. Since it is impractical to do these sessions in large groups, they are repeated as often as 30 times in one semester. Although the lecturer, a physician who has specialised in biology, finds this hard, he believes the students gain from this form of teaching and feels committed to continuing. The students agreed that the sessions were stimulating, and on reflection they could remember issues from them better than from a key lecture or even seminar. Observation 10 describes one of these sessions.

Observation 10: Teaching laboratory session on ECG

This was a two-hour workshop on ECG; the same session would be given to the nursing students. The first half hour was spent on theory, the lecturer using the overhead projector and board to write notes which the students copied. He also referred to diagrams in the Life Sciences Handbook given to the students at the beginning of the programme, and distributed a diagram of the normal complex of the ECG. Students then worked in groups to experiment in recording each other's ECGs. Once they became proficient at applying the electrodes and recognising the normal complex, the lecturer moved on to further exercises and tried to apply these to their practice. He reminded the students about the displacement of the heart to the left in normal pregnancy as the fetus grows, and asked students being monitored to hold their breath so the others could note the change in the recording.

'Why do you think the heart rate has decreased? Could this be significant in your practice? What about pushing during the second stage of labour?'

One group tried to visualise what happens when the breath is held and discussed the circulation of the blood through the heart and lungs and the oxygenation of the blood.

The university is geographically apart from the maternity units, making clinical sessions pre or post lectures impossible, so midwifery lecturers use the university's multiskills laboratories to demonstrate certain practical skills. A teaching session on vaginal examination is described in Observation 11. All the group had observed midwifery care in the community but few had witnessed care in labour or a vaginal examination.

Observation 11: Teaching laboratory session on vaginal examination

The students had been taught the anatomy of the gynaecoid pelvis and the theory of vaginal examination, so the session began with them being asked revision questions on specific aspects of vaginal examination.

The lecturer demonstrated the procedure on a model. One student talked about an article she had read on midwifery training in another country where money was too scarce to buy models or teaching aids, so students had to practise some procedures, e.g. vaginal examination, on each other. Questions were asked about the advantages of using certain solutions for vaginal swabbing since this is not standard throughout the three units. Some felt anxious about how they could learn to become competent at vaginal examinations without subjecting the woman in labour to a repeat examination.

Following the demonstration, worksheets were distributed for the students to complete. The questions related to determining fetal position by vaginal examination, and the students worked in pairs and used models of dolls and pelves to find the answers. They had great difficulty with this exercise; even using notes and textbooks the majority could not apply the information. None had performed a vaginal examination, so they could not use personal experience; only one appeared to understand the positions of the fetal head in relation to the maternal pelvis – this was because her mentor had recently done a teaching session with her on vaginal examination and fetal position as part of her Teaching and Assessment 997 course. At the end of the session, a student asked if she could borrow a doll and pelvis until the next day to could practise the various fetal positions. This was allowed and the rest of the group followed her example.

The students' opinions of the laboratory sessions were generally favourable since they often clarified issues which had been difficult to understand in theory. They felt, however, that some sessions were more appropriate than others; one problem seemed to be their difficulty using the session to bridge the gap between theory and practice if there was a time lapse in the sequence. The practical session on vaginal examination would have benefited them more if they had more knowledge on the anatomy of the fetal skull and the mechanism of labour and could then apply this knowledge to practice the following week while it was fresh in their memories. This was unlikely, since they were accompanying the community midwife at this stage and would be observing antenatal and postnatal care, rather than care in labour. One student commented on the differing policies in the three units and felt that learning how to perform a vaginal examination on the relevant labour ward would be important.

Practice placements Each midwifery lecturer is a practice link lecturer to one of the maternity units; that role involves supporting the students by counselling if necessary, and ensuring that their learning objectives are met and their supervision is adequate. The link lecturers also keep mentors informed on current developments in education and ensure they are fully prepared for their role, assist with clinical audits and liaise with clinical staff so that students' learning experience is monitored and evaluated. One day per week is spent performing this role, but there is rarely time to do any clinical teaching with the students. The other problem is that each lecturer is only familiar with one unit, whereas the students work in all three; this can cause difficulties when unit policies are questioned in class.

The students commented on the benefit of working with a lecturer, especially 'our own lecturer', because they could relate the care they gave to the theory taught in class. They also felt, however, that the midwives facilitated their learning and were always receptive to questions and difficulties in understanding. One student said:

> *'If they don't know the answer, they are not reluctant to admit it. We look it up, check it out together. It is quite reassuring to discover that we don't need to know everything when we finish the programme. Learning will continue once we qualify.'*

They went on to discuss the fact that midwives who have had the same training as themselves are more eager to teach and more up-to-date in current affairs and research. Some doctors are also keen to teach them, although medical students get priority. Occasionally a doctor may have difficulty understanding the relevance of some clinical experience to midwifery. One student encountered this the previous week:

> *'I was on my surgical placement and had negotiated with the nursing staff to attend a gynaecological clinic. The consultant was very reluctant, seeing no reason why I should be involved here. I finally persuaded him, so I was allowed in but then a medical student arrived so I was asked to leave.'*

Reflection on practice Students are encouraged on study days to talk about their experiences in clinical areas; this usually takes place at the beginning of the day and they find it beneficial. It gives them the opportunity to air fears, question issues and learn from others' experiences. It is sometimes possible for a student to meet the link lecturer within the maternity unit if she has an immediate problem.

The need for these discussions appears to be greater at certain stages of the programme, such as when students return to midwifery practice having had a 10-week break in non-midwifery placements. At this point, students seconded to a unit with only normal midwifery care change places with those who have been gaining experience in a unit providing care for both normal and abnormal pregnancies. Both groups initially find the change demoralising and disruptive. One student, who had moved from normal to abnormal, found the experience frightening:

> *'I feel completely lost. I have a different mentor every day because I am only on the labour ward rather than with a team. There seems to be general panic all the time and the midwives refer everything to the medical staff.'*

Another, who had moved from abnormal to normal also had negative comments:

> *'I don't like it. The pace is so slow, boring. I like to be where the action is – a busy consultant unit. I loved theatre, hated community.'*

This last statement was noted by the lecturer to be atypical of pre-registration students' views. Both students were reassured that they would adapt and benefit from the experience of two systems of care.

Another student then described a difficult delivery with which she had been involved the previous day.

> *'The woman suddenly progressed very quickly to the second stage before I was prepared. It was her third baby. I had some difficulty delivering the head so I started to think about shoulder dystocia. They did get stuck so we had to get the doctor. He did McRoberts manoeuvre just as you described in class last week and it worked. It was brilliant.'*

A discussion followed with both the lecturer and the students asking questions relating the theory to this particular situation.

How topics are taught

Pain According to the curriculum and the midwife lecturers, pain is taught in many sessions throughout the programme, both with a central focus e.g. pain receptors, pathways and transmission and with a peripheral focus e.g. care of a woman following caesarean section. The topic regularly appears in examination questions.

By the end of the second year, the students reported that they felt confident about their knowledge relating to pain in labour, which had appeared on the curriculum on several occasions as a central topic – history of pain relief, physiology of pain, pain pathways, analgesic methods, alternative methods and psychological aspects of pain. It had also infiltrated many other sessions such as continuity of care, preparation for parenthood, care in labour, place of birth.

The group was given a scenario by the researcher on caring for a woman experiencing pain in labour and asked to consider the biological knowledge they used to enable them to do this. They needed a lot of thinking time and brainstorming to get on to the right lines, but as one suggested an aspect of care, it triggered others to link that with underpinning knowledge. For example, the use of epidural was mentioned, which led to a discussion on siting, and the midwife's knowledge of the anatomy of the spinal column in order to assist the anaesthetist; the effects of the local anaesthetic and the necessary observations, and care of the woman – immobility, hypotension, pressure on inferior vena cava, bladder care. Forty minutes was spent on this exercise and the students produced a knowledge map showing what knowledge was relevant to the midwife's decisions and actions. The group felt heartened by the knowledge they found they already had, and felt the exercise had highlighted areas which needed further clarification and exploration.

Nutrition This topic also gets priority in the syllabus; many aspects are included – nutritional needs of the pregnant and lactating woman, needs of the normal, small and sick newborn and the benefits and disadvantages of the various methods of infant feeding. Reference is made to organisations in this country and others which are dedicated to the promotion of good nutrition for both mother and baby e.g. UNICEF and the Joint Breast Feeding Initiative.

During a discussion with a group of second year students, the researcher attempted to determine their level of knowledge of nutrition and how they use this in practice. They spoke about the anatomy of the breast and the importance of knowing this in order to fix the baby correctly and teach the mother. One recalled a situation where a midwife demonstrated how to test a baby's rooting reflex. Once she had seen this, she was able to reflect on and understand the theory taught some weeks before.

> *'I realised that I had not really understood it. You are shown diagrams but it is not the same.'*

They continued to consider what knowledge they needed to enable them to practise. One student said:

> *'You need to understand the physiology of lactation to know about the production of milk but you also need lots of experience with breast feeding mothers and work with midwives who know what they are doing.'*

A discussion followed about the depth of knowledge needed to enable someone to assist a mother breast feeding. Another student remarked:

> *'Some nursing auxiliaries are good at helping the mothers but I don't suppose they have had any theoretical training.'*

Lots of giggles and exclamations followed this statement, but no-one defended the need for knowledge. Constant reference was made to the importance of being with the women, babies and midwives in order to observe different situations and different individuals, interpret and understand and become skilful in assisting and teaching mothers in all aspects of nutrition. They said that once this had been achieved, making sense of the underpinning knowledge seemed easier.

Summary

The small intake of student midwives (16 maximum) allows for easy interaction and the building of friendships. Each group has a personal lecturer, responsible for their administration, counselling and general support. The whole team of lecturers teach all groups; personal lecturers for each group produce the timetables after liaising with the relevant personnel. The aim is that lecturers with specific skills, knowledge and interest teach that topic so the students benefit from their expertise; the students agreed with this philosophy although they also liked the continuity of one lecturer for the majority of their teaching.

Most teaching is done by midwifery lecturers to the student midwives on their own. These sessions could be described as maximum participation, with constant reference to the practice areas and skills by lecturer and students. During the common core programme, however, lectures in the biological and sociological sciences are taught by non-midwife teachers and shared with DipHE nursing students. These are unpopular with both student midwives and midwifery lecturers. The groups comprise 80-90 students, little application is made to practice and participation is minimal. A follow-up seminar led by the midwife teacher is often necessary to assist students to understand key lectures.

The distance of the university from the three maternity units makes visits to clinical areas in relation to the theory being taught that day impossible. The students report that, in most situations, the clinical learning environment is good, with the majority of midwives enabling them to observe, assist and practise as appropriate with the necessary supervision and teaching. Each unit also has a link lecturer, but teaching students in their clinical areas does not occur regularly due to other commitments within that role. The first set of pre-registration midwives qualified two years ago, so each unit has some midwives who have had training similar to the students. The students appreciated working with them and believed they assisted the other midwives in understanding the present programme. Practical demonstrations within university laboratories are given to replace clinical teaching sessions in the wards. Although students felt that some of these were helpful, others were not, either because they occurred too long after the theory taught or they were too unreal and not always relevant to all three maternity units.

The students allocated to the maternity unit providing only normal midwifery care must gain experience of abnormal pregnancies in another unit, so others from their group take their place temporarily. Both groups find this disruptive and difficult to cope with; they lose the support of their known mentor, and since this move occurs after their 10-week allocation to non-midwifery placements they also lose confidence in their knowledge and ability at this point.

Many students questioned the need for the depth and breadth of knowledge they are expected to develop; they felt some knowledge was required for examination purposes only. Several mentioned the ability and skills of many of the qualified midwives whom they admired but who did not have as much detailed knowledge of the biological sciences as they did. They frequently compared the midwives' skills with their own knowledge and believed that practical experience plays a major part in learning and making use of theory. Many expressed frustration at having to spend more time on theory than practice in their first year which results in many topics being taught to students with no prior knowledge and no experience to which they can apply this theory. Second year students appreciated returning to certain topics in the spiral curriculum and confessed that learning these again after having practical experience was easier to comprehend, more interesting and had obvious relevance to their practice.

3.5 Case Study 3: a DipHE nursing programme (CFP, adult and mental health branches)

Introduction

Case Study 3 concerns a DipHE nursing programme in a large school of health studies integrated into the local university. Most of the school is located on a hospital campus, with an education centre for mental health on a separate site. Students gain experience both in community and hospital settings; those sponsored by provider units tend to work in those units where appropriate.

The school offers a wide variety of programmes at various levels and in all aspects of nursing work. For the pre-registration diploma in nursing programmes there are two intakes per annum of 80-120 students, giving three cohorts at any one time in both the common foundation programme (CFP) and branch programmes. Entry requirements are five 'O' levels (GCSE grade C or above) or success in the DC test.

The school has over 100 lecturers; those teaching DipHE are organised, together with contributors from other university faculties, into specialist theme groups within the CFP and branches. Thus each will have a theme group for life sciences, social sciences and behavioural sciences, with some overlapping membership across branches to make full use of specialist knowledge. The overall programme leader also takes responsibility for the CFP and the adult branch.

Research methods

Observation of teaching and learning took place in classroom and practice settings from October 1993 to July 1994; 71 hours were observed in classroom settings and 16 in clinical settings. The classroom observations included 13 hours of CFP, 52 of adult branch and six of mental health branch. Of these, 32 hours were devoted to scientific knowledge in the disciplines and 39 to workshops in which the application of scientific knowledge was expected to feature. The number of sessions observed reflected the prominence given to our six topics and the need to observe a variety of teaching.

Short discussions with students took place around the periods of observation but formal interviews were more difficult to arrange. Seven were conducted in the mental health branch, each of about two hours duration; 21 were conducted in the adult branch, mostly for between one and two hours.

Meetings were held with lecturers to discuss patterns of teaching in areas we were unable to observe or were requested not to attend. For example a two-hour discussion was held with the lecturer responsible for behavioural science teaching on the mental health branch, reviewing teaching plans, strategies and programme materials. Two one-hour discussions were also held with mentors in mental health clinical settings.

Considerable quantities of documentary evidence were also analysed, including curriculum documents, teaching material, examination papers and a sample of student answers to examination questions.

Overview of the curriculum and its assessment

The programme lasts three years and is divided into CFP (18 months) and branch (18 months); students select a branch on CFP entry. This study was confined to the CFP, and adult and mental health branches. The majority of the CFP curriculum is delivered on the university site and the majority of each branch on a hospital site.

Common foundation programme

The is divided into five 12-week units; the remainder of the programme comprises two weeks introduction, a week of preparation for the chosen branch and 'holiday'. The university component is delivered by seven discipline-based teams using university staff from outside the school of health studies as well as nurse lecturers. Their specialist themes and time allocations are listed in Figure 11.

Nursing studies	102 hours
Nursing practice	363 hours
Applied health studies	168 hours
Science applied to nursing	102 hours
Behavioural science	102 hours
Social science	102 hours
Information technology/enquiry	48 hours

Figure 11: Themes and time allocations of the CFP

Clinical experience occupies one day a week for the first two terms then two or three for the remainder. The focus of clinical experience is the development of nursing knowledge, methods and skills through reflective and reflexive learning. Student placements are arranged in a variety of community and institutional settings; the aim is to maximise learning opportunities with supervision and support, so individual student programmes may not be identical. Supervision is carried out by experienced practitioners, supported by lecturers from the university. Students are expected to move from being beginners to being ' knowledgeable observers' and to demonstrate the safe accomplishment of the essential skills specified in their documentation.

Theoretical learning is assessed in different ways according to the discipline: science applied to nursing and sociology/social policy are tested together in a three-hour examination. Candidates are asked to attempt four out of 10 questions, including a compulsory question in the life sciences and at least one from the social sciences. Three papers were reviewed; apart from one calculation question, all life science questions relied on rote learning of pure anatomy and physiology. One question on each paper asked the candidate to discuss the usefulness of sociological concepts for nursing and nurses or to consider the relationship between sociology and the nursing role, requiring a consideration of its application to practice. The other social science questions concerned health policy, but could be answered from a purely disciplinary perspective with no explicit reference to nursing. Nursing and applied health studies are also tested together by a three-hour examination. Behavioural science is tested over four months by coursework, and information technology by a submitted assignment.

The adult branch

The adult branch attracts about two thirds of all students. The majority of the programme is delivered from a hospital-based university site, although clinical experience is gained in a variety of settings. Formal teaching is delivered by the same specialist theme groups as in CFP, though information technology is absorbed into nursing practice, and enquiry into nursing theory. Time allocations are listed in Figure 12.

Nursing theory	220 hours
Nursing practice	264 hours
Behavioural science	55 hours
Social science	66 hours
Life sciences	99 hours
Theme workshops	30 hours (5 day conferences)

Figure 12: Time allocations for the adult branch

Clinical experience is phased in with university teaching in varying amounts until six months of rostered service begins in week 52 accompanied by a weekly tutorial.

The assessment of clinical practice is undertaken by a trained supervisor, while theory is tested throughout the programme by three assignments and two three-hour examinations. The life sciences paper was divided into two parts: the first required six out of 10 short answer questions on scientific knowledge, the second required two out of four discussion questions on client profiles. In marking these profiles the 'bottom line' criterion appeared to be whether 'the student's proposed plan of action was both appropriate and sufficient to meet the client's assumed needs?'; inaccurate knowledge or lack of understanding did not of itself lead to failure. Social and behavioural science questions required that theories and clinical applications be specifically addressed, usually in a two-part question structure with 25-30% for theoretical component and the remainder for clinical application. Students provided a wide range of responses from simple descriptions and prescriptions for care to complex analyses drawing on theoretical ideas supported by literature and research evidence to give rationale for their actions. One question out of five had to be answered in each half of the paper.

Mental health branch

The mental health branch takes one quarter of the students. The programme is run in a university education centre located within a mental health facility. Teaching is provided by academic staff from the theme groups and qualified practitioners. The programme also offers opportunities for shared learning/teaching with other programmes. Students are supported by a personal lecturer assigned to them at the commencement of CFP. The main themes and their time allocations are listed in Figure 13.

Mental health nursing practice	180 hours
Mental health nursing theory	85 hours
Behavioural sciences	132 hours
Psychiatry	146 hours
Social science	95 hours
Applied philosophy and law	81 hours
Life sciences	45 hours
Community studies	30 hours

Figure 13: Themes and time allocations of the mental health branch

These allocations cover formal training during the first 44 weeks, but exclude contributions (mainly nursing practice) to the 11 study days in the final 22 weeks.

Clinical experience progresses in three 22-week phases; in the first the students' role is observer, with a client caseload of three; in the second they progress to supervised participant with a caseload of six; in the third they progress to accountable practitioner with a maximum caseload of eight. Time allocations for the phases are 307.5, 585 and 742.5 hours with the last 1,000 hours on rostered service. Arrangements for clinical practice are based on a client caseload allocation rather than a location, the caseload growing and diversifying over the programme. Students have a clinical supervisor in addition to a personal tutor.

The assessment of theory comprises a final examination and a portfolio of work related to clinical practice and the student's learning needs. The examination is divided into three parts: social science, behavioural science and nursing practice; all questions are set in relation to a short description of a client with age, social history and current assessment status.

Nursing questions focus on client assessment, nursing responses, clinical skills required including theoretical knowledge base and practical actions. Social science questions focus on the use of concepts and theories to explain clients' behaviour. Behavioural science questions focus on the social context, the role of a helping agent, the impact of psychological issues on clients and their behaviour, how particular therapeutic approaches may be useful and be evaluated and the implications of theory for relationships with clients.

Although all three approaches are seen as separate and distinct, all are brought to bear and give insights to a particular client's problems. There is therefore, explicit linkage of theory from each discipline to aspects of client care and management, although no links are made between the disciplines nor the separated aspects of nursing practice.

The biological sciences, although taught in the branch programme are not explicitly tested. The scenarios presented in the examination offer opportunities to ask about biological issues but these are not taken.

Approaches to teaching and learning

A variety of teaching methods were used; the approach adopted in any particular session was determined mainly by the number of students, also by the style of the lecturer. Where there were over 100 students the approach tended to be almost exclusively didactic; few questions were asked, and when they were, questions and answers were not always easy to hear because of the size of the room. In small group teaching of around 20 students, a much more interactive approach was used; in some instances the entire session was in a question and answer format involving the whole class.

Students in the CFP initially have a timetable of lectures primarily in the three science areas, with a fortnightly seminar in behavioural and social sciences the occasional seminar, and three-hour practical sessions in biological sciences. The five week mental health and learning disability 'tasters' include two-week placements and three weeks of theory.

The size of the groups tends to dictate a mix of large hall lectures, complementary seminar work in the social and behavioural sciences and nursing topic focused workshops. The lecturer in the social science seminars moved between groups in different rooms so students were sometimes left on their own.

In workshops (adult branch), there was usually a small introductory address after which students broke up into groups, usually four, and were given information – mainly journal articles – and questions to answer. Students undertook this with no great enthusiasm; in discussion it appeared that most workshop sessions were conducted in this way and the students were 'fed up' with them. In the opinion of the observers most packs had too much information to be read by each person in the group; students read different articles then 'pooled' the information. They then undertook a feedback session, which was mostly received uncritically by peers and lecturers.

This teaching approach raised a number of problems. Students were only able to read some of the information in their pack, and since packs had to be returned at the end of the session there was no further opportunity to read their own or other packs. Nor did they appear to have a reading list which would enable further study. Since the answers to the questions were within the packs, students simply had to find them; they were not required to process the information. Finally, time was very short for feedback, and there were many instances where challenges could have been made to clarify students' understanding, if there had been time. The most positive aspect of these sessions was that students appeared quite confident at presenting their conclusions to the group.

In the mental health components of the programme there was much more emphasis on participative learning through experiential classroom work. Class size was small (maximum 15) and exercises were structured by the lecturing team using exercises graded for the different stages of the programme. Video was also used, both pre recorded material for discussion and recording to enable feedback on students' interpersonal skills. Role play was also utilised as an adjunct to communication skills development but was not well liked by the students. These sessions were not observed but researchers had access to the materials used and the lecturers.

Teaching about fluids and electrolytes

This topic is taught in both the CFP and adult branch. The main CFP teaching comes in the second term with four one-hour 'renal' lectures. Additional material is covered in some cardiovascular lectures in the same term, and in lectures on homoeostasis and haematology. These lectures were given to the entire group of about 120 CFP students by university lecturers from the biology department. Their general style is exemplified by the lecture described in Observation 12.

Observation 12: A lecture on interstitial circulation

This session was the last in a series on the cardio-vascular system, and followed the renal sessions. It should have been on shock and had been changed to interstitial circulation. The lecturer began with a brief reference to the last session. He discussed the structure of capillaries, exchange of fluids and pre-capillary sphincters and their role in shunting in relation to temperature regulation.

He discussed the mechanisms involved in maintaining interstitial circulation and commented how, in principle, oedema might occur if there were problems with the plasma proteins. He then commented about oxygen and carbon dioxide gradients in the tissues and said he would come back to this in the adult branch programme.

He then discussed the role of lymph channels in maintaining interstitial circulation and their eventual return to the subclavian veins, and commented on the role of lymphatics in the absorption of fat.

The final section was on control of blood pressure when moving from the lying position to standing. He discussed mechanisms involving both cardio-regulatory and vasomotor responses.

The lecturer was easy to hear and the pace was such that students could take satisfactory notes. This was aided by overhead transparencies. At no time did the lecturer question the students, nor did they respond to his offers to answer their questions.

The topic is reintroduced at the beginning of the adult branch as part of a series in which lectures/lead sessions are followed by workshops. Two lectures on fluids and electrolytes were given to about 90 students by a nurse lecturer for whom this was a specialist teaching area. There was little interaction because this was expected to occur in the workshops where groups of 18 would make it more feasible. These workshops were also intended to cover the application to nursing practice of the scientific knowledge covered in the lectures. A typical lead session is described in Observation 13 and two workshops in Observations 14 and 15.

Observation 13: A lead session on fluids and electrolytes

The first part of the session involved discussing handouts with detailed information on fluid compartments, fluid balance, osmosis and diffusion, electrolytes and the mechanisms of interstitial circulation. Papers included some self-assessment questions and the answers and a paper setting out the aims of this session and the workshop.

The second half of the session was used to discuss oedema. Oedema was defined and three causative factors were introduced; each was discussed in turn and an explanation given of how it could result in oedema. No questions were asked by students and none were asked of them by the teacher.

Observation 14: A workshop on fluid and electrolyte problems

The teacher began by reminding them of what he covered in the lead session then asked students to work in groups. There were four groups and four topics:

Dehydration
Fluid overload
Potassium imbalance
Sodium imbalance

Each group was given a topic, information pack and the following set of questions:

1. Which groups of clients might suffer from these conditions and why?
2. Describe the clinical manifestations of clients who present with these problems.
3. Which ward/laboratory investigations would be needed to monitor them.
4. What complications might occur if the condition was not observed and rectified.

After the work period the groups presented their conclusions; these presentations were completed in half an hour, giving little time to make adequate notes. Students had access only to the pack handed to their group, which was returned at the end of the session; but they did have the lecturer's handout which included summarised answers to the questions for each of the topics.

The presentations were somewhat truncated and more clarification was probably needed in several places; in the limited time available only one question of clarification was asked by a student and answered. Students did not appear to always understand what they were saying, and implications for nursing care were not addressed.

Observation 15: A practical workshop on saline drips

The final session was a practical one on how to put up a bag of solution, including calculating infusion rates. The students stood around the demonstration table so they could see what the lecturer was doing. He demonstrated how to cannulate a vein; a student asked why he was demonstrating this when nurses were not allowed to cannulate veins, to which he replied that some specialist nurses were now doing this.

In the remaining time he gave them two clinical scenarios related to the topic areas they had already considered and asked them to consider the nursing management and prioritisation. No questions were asked by students to clarify any of the issues in the scenario. The care process was then highlighted by the lecturer on OHPs, making assumptions about the case which were neither discussed nor explained. Two questions were asked by students, both related to client safety and were relevant.

In the discussion of nursing care none of the previously introduced scientific knowledge appeared to be used, so although there was discussion of 'nursing care' there was no mediation of scientific knowledge.

The fundamentals of nutrition are taught in CFP during five study days, one each term. Normally 'theory' is taught in the morning and the afternoon is used for resource reading and skills teaching related to nutrition. The content of these days relates to general aspects of nutrition and common influencing factors. They are introduced by a lecture session (Observation 16).

In the adult programme there are three days, relating to specific illnesses with a nutritional dimension, such as diabetes and renal failure. Teaching is undertaken by a team of specialist lecturers who teach in the CFP and the branch programme.

Observation 16: Lecture on nutrition

This session was conducted by two lecturers. The introduction was an 'exercise' asking students to think of food they like and don't like in order to explore the feelings they evoked. This led to four questions:

Why do we like some foods and not others?

Where do eating patterns come from?

Why are some eating patterns similar?

Why are some eating patterns dissimilar?

In seeking to answer these questions the lecturers explored how eating patterns develop in childhood. The question was put to students and answers were written on a white board, clearly visible at the back of the room; these covered a broad span of factors, which were then explored in detail.

1. Parents: Used to explore power struggles between children and parents, and changes when eating moves from parental control (under 10 years) to child control.
2. Adolescence: Factors influencing eating habits, such as peer groups and the media. Culture pervades all our lives and significantly influences what we like and dislike. Likes and dislikes can also change over time.
3. Early adulthood: Current influences, such as cost, time and the botherness factor.
4. Adulthood: Effect of marital status.
5. Elderly: Loss of teeth, money, the botherness factor and the inability to shop and/or cook.

Factors maintaining eating habits were identified as including other people, convenience, physiological responses, conditioning, social context and expectations. How does this affect our clients when they come into hospital? What do we as nurses do to them? How far do we consider our clients' nutritional needs?

The major food groupings were then looked at. Students were advised to use texts to identify factual information regarding calorie content and requirements. There was some discussion on factors throughout life which affect calorific requirements. Discussion continued about recommendations on calorie requirements and the quality of various sources. Particular comment was made on the issue of fats in Western diets.

The session was conducted in a pleasant easy style and considering the size of the group there was good interaction between lecturers and students.

This is followed up by one seminar (Observation 17) and a workshop on nutrition and wound healing (Observation 18). Additional material on the related topic of growth was covered by four one-hour lectures.

Observation 17: A seminar on nutritional intake

This seminar was for about 18 students, using food diaries which they had been asked to keep. It was conducted by one lecturer and a handout was given identifying advisable food portions between bread, milk, meat and fruit and veg., and including calorie content of common foods. Students worked out their protein and calorie intake over the day they had kept their food diaries. The teacher put their findings up on the board. [The observer was concerned at the low purported intake of one female student (840 calories) who looked excessively thin. This was not commented on in the session.] The findings were used to examine the factors influencing calorie needs, such as gender, age and level of activity. Students were advised that it would be more accurate if they did this exercise over several days. Protein intake was then discussed and the body's uses of protein.

A student's comment that if clients had nutrition problems on the wards they would be referred to the dietitian provided the opportunity to discuss the respective roles of dietitian and nurse in meeting clients' nutritional needs. It was noted that the nutritional intake of clients in hospital is often inadequate.

The session ended with a quiz looking at students' knowledge of fats, which was self-administered and self-marked.

The lecturer made determined efforts to make the information relevant to clinical practice or/ and everyday life and there was quite a bit of interaction between students and teacher.

Observation 18: Workshop on nutrition and wound healing

This workshop was given by a clinical nurse specialist (nutrition) to about 18 students.

The first part was used to explain and expound the role of the nurse nutritionist, suggesting nurses too quickly refer clients with nutritional problems to the dietitian and that this is an abrogation of their role. The lecturer stressed the importance of nursing assessment, but did not describe or explain it.

She then introduced the main topic as the physiology and manufacture of collagen and the use of trace elements and vitamins in its synthesis; she recommended a textbook on nutrition for nurses. The session centred on the synthetic steps involved in the collagenoblast using proline and lysine to form hydroxyproline and hydroxylysine, the forming of peptide chains and the production of procollagen and tropocollagen. She linked trace elements zinc, iron, magnesium and copper and vitamins B_5, C, B_1 and A to the synthetic stages, mentioning the enzymes involved in this process. The sources of these trace elements and vitamins were described, normal daily requirements for them, and situations which could create excess loss or increased need.

Two handouts were distributed, one on the stages of collagen synthesis, the other a self-test quiz on wound healing. None of the questions related to nursing.

Overall the session was quite complex and technical. There was no explanation of how the nurse could assess deficits in wound healing on the basis of defective collagen synthesis or recognise that such a situation existed. The students did not ask questions and none were asked of them.

Teaching about stress

Stress is taught in the CFP and both adult and mental health branches.

The main contribution to CFP was five weekly, one-hour lectures given by a non-nurse lecturer to a group of 100+ students and supported by two seminars led by other psychology staff. These came about half-way through the CFP, three months after the 'fight-flight' mechanism had been covered in a life science lecture; and were followed three months later by groupwork in the mental health section of the CFP. The theory was taught in a light-hearted way, trying to draw on student's personal and clinical experience as much as possible. Students were encouraged to ask questions both during and after the lecture (detailed descriptions are provided in Observations 19 and 20).

Observation 19: A behavioural science lecture in the CFP

The lecturer introduced himself, explained where he could be contacted, his interest and background in psychology, his lack of nursing experience and his current research interest in psycho pharmacology. His style was light-hearted, energetic and enthusiastic. He introduced the lecture series saying that it is common knowledge that stress and illness are related but we need to be able to back up and prove how psychological state affects well being. He also told students they were going to be doing a stressful job and he would try to discuss ways to understand and help cope with stress, as well as preparing them for their behavioural studies assignment.

No reference was made to life science lectures on the flight/fight mechanism and other stress related physiology.

'We are all stressed (but) how do we understand and conceptualise stress?' he asked. There was little response. He put a definition on the OHP which was mainly physiological responses to stress but did include emotional disturbance. Students were asked how the body reacts to stress factors such as change in temperature or excess noise, but did not respond. The lecturer noted difficulties with the concept of stress, then introduced three classic models of stress: response, stimulus and interaction. A handout was distributed, and he drew attention to its format which presented aims, objectives, and key points for each model, and a reference for further reading.

He now asked *'How do you know you are stressed?'* The students began to respond; the lecturer repeated all comments aloud so all could hear. When all suggestions were exhausted he summarised them 'as a particular pattern of psychological and physical responses' and related this to the work of an author named on the handout.

He discussed the response model in detail without apparent reference to notes and critiqued that theory, saying why it was not appropriate. He referred back to the list constructed by the students.

He then returned to the handout to introduce the next model, stress as a stimulus and as a set of causes. He asked students for their stressors which were treated in the same way, then discussed the key characteristics of the model with examples and added to information on the handout. Students were making notes on the handout, just listening or even knitting!

The pattern continued for the next model, then the lecturer recommended a textbook on stress, and used an OHP based on a list from the textbook to introduce a new discussion on the kinds of things people find stressful. Two key ideas were discussed: controllability and predictability. He described two experiments in relation to these ideas. The ideas were discussed in terms of pros and cons and he asserted that even current thinking was not 'tablets of stone'.

He asked if there were any questions – there were none, then made reference again to further reading and outlined the nature of the following week's lecture. At the end of the session two students asked questions and clarify one or two points in relation to the reading.

Handouts were given to support the lecture, students having made notes from OHTs and references listed. The seminars were not referred to: probably because the lecturer was not involved in them. This topic was also the focus of a submitted assignment; students were required to analyse a scenario from their own experience in relation to the psychological literature. The CFP 'mental health' preparation sessions used experiential groupwork to enhance students' self-awareness of their stress responses as a precursor to dealing with stress in their clients.

Observation 21: A life science lecture in adult branch

The life science lecture on stress was taught to about 80 students; it lasted about 40 minutes although scheduled for an hour. The previous week the lecturer (with a background in intensive care nursing) had given a session on shock. The students were engaged in practice placements in medical, surgical and elderly care nursing at this time.

The lecturer began with a statement *'This follows on from your session on shock. It is physiological stress, not a psychological state which has nothing to do with it.'* She placed a definition of stress on an OHP, saying *'it is a complex mechanism like shock'*. Another OHP was shown immediately, with a complex diagram of a feedback loop. The brief description followed the pathway *[the observer found it impossible to note down and take in what was being said]*. This was immediately followed by another OHP of a complex graph of the three stages of the fight and flight mechanism, accompanied by *'the release from the adrenal cortex hormone catecholamine (sic). Hence there is a physiological response as well as an emotional response. Moreover, there is a response to stress even in sedated or anaesthetised clients which is why clients in ITU have Cimetidine or Tagamet therapy.' [The link was not explained between the release of the hormone and giving clients a drug normally associated with gastric ulceration.]*

A fourth OHP on acute stress response listed 12 statements identifying how the body is activated. The lecturer gave examples or asked questions about each statement, but these were not always applied to practice. For example, in statement seven, about liver reaction, students were asked why this was included. One responded with 'breakdown glycogen' which was accepted. The lecturer passed on, saying *'long-term stress like an ITU client will experience means they will also start breaking down fat and protein.'* There was no discussion about how this might be identified or its consequences for the client or nursing care.

The next OHP summarised endocrine response. It was 25 minutes since the start of this session and the pace was very fast. There was a very brief discussion of the experience of fear; students were asked for their experiences but nothing was forthcoming. She then referred to a handout distributed the previous week on shock and talked about a client in shock already producing adrenaline and therefore to add stress gives additional problems. She gave an example of a client with burns in an intensive care unit describing the kinds of things that can happen. A student asked about steroids but it was difficult to hear the response. Another asked a question; students who could not hear began to start their own discussions. The response heard was about the balance of crystalloid, plasma and blood infusions in a burns client. The answer suggested this was a complex area *'given that the local burns unit had five or more different calculations for fluid replacement in the first four hours'*. The session concluded with a statement about the link to the following session on pain. There had been no discussion of how to recognise a client in this situation or what nursing actions may be appropriate, nor any recognition that stressed clients might exist anywhere other than in intensive care or burns units, neither of which are part of these students' experience before qualification. The students and lecturer adjourned to the coffee bar but no students approached her with questions. The ones I spoke to appeared to be satisfied with the session.

In mental health the behavioural sciences are taught by weekly three-hour sessions by a visiting lecturer with a clinical but non-nursing background. Psychological theories, research and literature on stress are discussed, initially in relation to self-awareness and later for managing 'distressed' clients. This theory is complemented by nursing theory and practice focusing on management and self-awareness skills through groupwork activities which are mainly theoretical. Final assessment is in the form of an examination requiring students to analyse a client scenario in relation to questions on behavioural sciences, social sciences and nursing theory/practice – which are separately marked by different teachers.

In the CFP, the psychological perspective on stress is introduced, then discussed and mediated in relation to the student's experience of stress and stress reactions. The relationship between the psychological and physiological perspectives is not addressed, and the use to which this knowledge can be put in practice is not made clear. In the branch programmes psychological theory is treated separately from physiological mechanisms; and neither is discussed during sessions on nursing assessment. 'Theory' is separated from 'nursing skills' by timetabling,

Observation 20: A second behavioural science lecture in CFP

The second session observed followed much the same plan, opening with identification of the four key coping mechanisms he wished to discuss, with references, and a five minute recap of the key points of the model discussed at the end of the previous week. He then outlined his aims and objectives for the session. An OHP was put up of the stressful life events scale, with reference, followed by discussion about its appropriateness and application. Direct coping (first heading on handout) was discussed with an example 'a good strategy for exam nerves is to go to the library and do some work'. Students were asked to suggest problems which were not amenable to these strategies. When none were forthcoming he gave his own: *'you will be confronted with bereavement and stress, you cannot tell them to get a new one!' 'you cannot change getting old!'* He then discussed aspects of the model which were thought to be deficient.

The next strategy on the handout was palliative coping mechanisms; students were asked for their own examples and then for distraction or displacement activities. They responded appropriately and in a light-hearted way. Other theories and ideas were discussed, with the lecturer giving examples from everyday experience and a teasing illustration of reaction formation: *'I know why you are all nurses, compensating for a real hatred of people, wanting to show the public.'* Students were asked to reflect on their own behaviour if they did not believe the ideas put forward. When asked if there were any questions one student asked about sport as a palliative coping mechanism and there followed a discussion involving six or more students on the benefits or otherwise of sport.

In the adult branch the main focus of teaching on stress falls to the behavioural sciences, delivered through main lectures (100+ students) and student presented seminars (25 students) in advance of or following a lecture on the same topic. It first appears in term seven as part of a programme of five lectures/eight seminars on adjustment and coping, and reappears in term nine as part of a programme of five lectures/six seminars on helping clients to cope with hospitalisation, medical procedures, and managing distressing events. Teaching is delivered by a lecturer who was a nurse but is no longer clinically active. Stress-related questions have appeared as at least one (usually two) from a choice of four during the last three years of the behavioural science component of a shared behavioural/social science examination. Students are normally required to consider the application of psychological concepts to nurses, nursing or the care of particular client groups. Stress is addressed in life science teaching as a one-hour lecture following 'shock' in the same part of the programme. This deals purely with physiological responses to stress and is described in Observation 21.

curriculum planning, and allocation to different lecturers; this continues in the majority of assessment strategies. Positive attempts were made to relate theory to practice by examples and reading material, and by a teaching style which encourages reflection on practice situations, but mediation and the assessment of students' skills in practice remain problematic. Content appears to be well covered and some knowledge of the importance of assessment criteria imparted, but the skills of carrying out an assessment, and the ability to recognise stress and make an appropriate response are not allocated any time.

The teaching of self-esteem/self-concept

Coverage in the CFP is light in comparison with the branches. It provides the focus of one lecture (Observation 22) in a series of five on social psychology in the behavioural sciences programme and one of the accompanying seminars, then plays an important part in preparation for and discussion of experience in the mental health/learning disabilities placement, where about nine hours of discussion were reported to have focused on issues raised by students about self and self-esteem.

Observation 22: Introductory lecture on the meaning of self/self concept

The lecturer was a member of the psychology department, who was also a qualified nurse. It was the second in a series of social psychology lectures held in a crowded lecture theatre.

He introduced the subject in a jovial way making some jokes at his own expense, then switched on the OHP to reveal three questions that would provide the focus for the lecture. His style was open and conversational, using examples from common experience and nursing related examples. The OHP revealed definitions of self and 'sources of self', both of which were discussed with examples.

The next OHP set out four characteristics of the biological self, with the full reference cited. This included a brief discussion with examples including the influence of sociological variables (family, culture, geography) and how these affect our sense of self, using examples; he drew on his own experience as a non white British person to highlight ambiguities. Some students chipped in with their own experiences and questions and comments which were appreciated and discussed.

The lecturer introduced a discussion of *'aspects of social self of interest to social psychologists'*, starting with an OHP depicting William James' notions of self as material, spiritual and social. This led on to examples of how we see ourselves and how that affects our behaviour.

The next section looked at theories about how we construct image of ourselves through the stages of development and discussed Goffman's notion of private and public selves and Festinger's of social comparison, each time posing open questions (which the students interpreted as rhetorical) and giving examples from everyday living to amplify the theory. He then looked at the self as historian and the self and behaviour.

Each section had the key heading, three or four main points and a full reference on an OHP, shown as the 'chat' about each went on; this enabled students to interrupt, ask questions, pose problems and disagree as he went on.

At the close of the session he stated that 'as people in contact professions we need to be more aware, more conscious and better self-monitors', then set a question for discussion in the subsequent seminar. Students approached him at the end of the session with questions and problem situations from their practice. One also checked out her ideas for her assignment.

Adult branch

Self-concept, self-image and self-esteem provide the principal focus at the beginning of the first term in the behavioural and social sciences components. In the first four weeks there are weekly lectures followed by seminars (each lasting for one hour) in the behavioural sciences; these focus on adjusting to and coping with changes in self-concept and self-image related to chronic illness, body image and terminal illness. A seminar and lecture on altered body image are described in Observations 23 and 24.

Observation 23: A behavioural science seminar, adult branch

This seminar took place a week before the lecture on the same topic, altered body image and disfigurement. The group of 25 conducted the seminar with the lecturer in attendance. The lecturer was a nurse not currently involved in clinical practice. Three students introduced the session, each making a short presentation. Their topics were person disfigurement, altered body image and the role of the nurse; each read from a pre-prepared script giving definitions and quotations from identified texts and describing some of the ideas. The third student also presented ideas for discussion about useful strategies to help clients. These presentations took only 10 minutes, leaving the lecturer with a longer discussion than anticipated.

He began by asking why nurses do callous things like those cited in examples from presentations. Another student suggested the idea of a coping mechanism, which the lecturer amplified, then related to denial and other defence mechanisms, whose study was pioneered by Kubler Ross. The students had referred to her work and he discussed how it came to be done as well as the findings they had described.

The students were asked '*How do we prepare ourselves to cope?*' and several offered statements but no deep thought or related to any theory. The lecturer added examples from practice and from the literature of a person experiencing coping with change (Simon Weston). He related this back to the concept of 'learned helplessness', introduced in a CFP lecture, and talked about changes in body image and loss and asked about the kind of loss a person may experience. Students again made simple statements but identified the difference between loss of activity and handicapping by society and its treatment of you. The lecturer related this to a social psychological research experiment and study.

Students were asked how they would help people cope. Again there were simple statements in response but one volunteered the experience of her family and another her experience in a radical surgery unit as an auxiliary. There was little discussion and the lecturer related this kind of adaptation to those we all make in our lives (hair colour, minor surgery etc.) and then the problem of learning new skills and relearning how to relate, both for our clients and for ourselves as nurses.

The session closed. Lecturer and students prepared for his lecture which followed immediately, on a different topic. The lecturer had amplified the students' work, asked questions, related their answers to the social theory and previous teaching and tried to push students to greater depth of thinking in relation to themselves and their clients.

Observation 24: A behavioural science lecture, adult branch

The session on altered body image was delivered by a lecturer in nursing to about 85 students. He outlined the importance of the topic and asked about the kind of clients students had come across in clinical areas. He then put a definition on the OHP which he discussed in relation to the difficulties it caused. For example, we might view our body in one way while others view it in a different way.

'I might see myself like Mel Gibson but . . . !' (laughter from the students).

He put a model of self-concept on the OHP and discussed the three elements with examples, then posed a question *'Where does self-image, self-concept come from?'* There was no response, so he put up an OHP with authors' names, slowly revealing them and talking about their work, findings and how the work was done.

He asked for examples where self-esteem is diminished or enhanced by people around, then gave his own example. He continued to describe studies of body physique and the impact of changes through life, both normal and when affected by illness. Students were asked for case scenarios of changes and adaptation to sudden illness; they offered five (stoma, mastectomy, amputation, burns and arthritis); the difference between the first four and arthritis was identified by the lecturer. Research in relation to these areas were briefly summarised.

A model was depicted on the OHP of the relationship between three aspects of our views of body image: body reality, body ideal and body presentation. Body image was shown to affect self-esteem. Discussion followed about how individuals normally manage 'body presentation' and how this may be affected by illness. The implications of the loss of a body part were discussed in terms of how body presentation is managed and self-image is affected. Students were asked to suggest strategies to assist individuals in this situation. This discussion referred to previously taught coping strategies and models for helping. He tested students' knowledge by asking for the categories and interventions identified in Heron's work.

Finally he gave a resume of key points discussed in the session. A few students asked questions but many had participated supplying examples and case scenarios.

The social sciences component also has a weekly lecture followed by a seminar, each of 1.5 hours duration. The first two, on stigma and institutionalisation, related self-concept and self-esteem to particular client groups; the lecture on stigma is described in Observation 25. Self-esteem is also referred to in the theme workshops on cancer and on sexuality, which remind students of its relevance rather than further develop their understanding. Assessment is carried out by a three-hour examination at the end of the programme, which covers both behavioural and social sciences. Questions relating to self-esteem/self-concept regularly appear in this paper.

Observation 25: A social science lecture, adult branch

The lecture was given to a group of 85 by a lecturer who is a qualified nurse no longer in clinical practice.

The topic was introduced, and an OHP was put up with an author's name and date. Three key points from the author's work were revealed with an example of each drawn from general experience in society. The next OHP showed two key points from another author's work which amplified the points made and gave examples directly related to client groups in adult nursing. The possible effect of stigma was discussed.

The lecturer then put up an OHP outlining two key points from the original author's work on reactions to being labelled and acquiring a label. Each point was discussed with an example from health care and comment made about the implications. The way stigma affects people and the way they manage the label was discussed with the key points from Goffman's work on OHP, an example from adult nursing and occasional reference to mental health. Three studies were cited on the impact of stigma on client groups; and their findings briefly described. Students were asked if there were any questions; there were none. The lecturer drew their attention to their seminar questions (previously supplied) but reiterated the focus of their discussion *'the consequences of labelling for a person and how they might manage it'*.

Mental health branch

The first unit of the mental health branch is on self and psyche, in which self-concept and self-esteem are key concepts. Teaching incorporates lectures in the behavioural and social sciences and workshops in mental health nursing practice and nursing theory. The main theoretical treatment occupies most of the behavioural science lectures in the first two units; in the social science lectures, the central issues are deviance, stigma and labelling, to which self-esteem and self-concept are closely related. Assessment involves a behavioural science essay and a three-hour examination covering behavioural and social sciences.

Self, self-esteem and self-awareness are key topics throughout the first two units of the programmes in mental health nursing practice and theory, taught mainly by experiential activities and group work in response to student determined need and feedback on their progress in practice. Lecturers have 10 pre-prepared teaching packages which comprise up to eight exercises for use with small groups to develop understanding and awareness of self. These sessions run in tandem with the social and behavioural science programmes. Again this is tested both in the final social behavioural nursing three-hour examination and by continuous supervision in clinical practice.

Student perspectives on the education-based component

The common foundation programme

Criticism of the university-based parts of the programme was mainly directed at the CFP, which most students wished had been limited to 12 months, with the other six months transferred to the branch programmes. This reflected their view of curriculum priorities. More specifically:

- mental health students felt the CFP was unduly biased towards the adult branch; only three weeks were specifically devoted to mental health
- discipline-based teaching in the biological sciences was seen as too detailed (more suited to biology degree students) and too remote for nursing
- the emphasis given to health rather than disease processes was too great.

Students also referred to time spent 'hanging around', alluding to gaps in their timetable, a common feature of higher education, exacerbated when there is no easy access to study space. At a deeper psychological level, 'hanging around' also meant waiting to start 'hands on nursing', which tested many students' patience.

> *'Is it nursing I'm doing or am I going to sit on this bench (forever)?'*

A second area of concern was students' perception of the quality of teaching. They were very articulate about what they saw as a good session and very critical of those they saw as poor. A good teaching session was characterised as follows:

> *'An animated teacher for a start, someone who is interested in the subject and comes well prepared, with references; and if you ask a question will say, "I know" or "I will find out", and is generally responsive.'*
>
> *'Our tutor was well organised and she always gave us a bit of paper explaining what were we going to do and clarifying what we had done in class and again going through each section of the programme explaining what it was about.'*

Other factors which helped were handouts and variations from the traditional lecture. Sessions that did not help were:

> *'Where there was 150 of us in a lecture with the lecturer teaching degree level and putting up 5,000 OHPs.'*

Even when sessions in social and behavioural sciences were identified as having 'good' content, relevance and presentation, there were concerns about when they were timetabled and how this affected learning.

> *'Our CFP would have sessions on eating and drinking but they would be about three months apart and they perhaps would be about a balanced diet and then eating aids and then other sorts of feed. There wasn't really any continuity and, although you might be expected to do some work in between, you had often forgotten from three months before.'*

The third area of concern was fragmentation; sometimes this referred to topics being delivered in bits and pieces several months apart, more often to the separation of theory presentation from practical experience.

> *'With life science it was most disjointed, we did normal A&P of the heart and we did heart attacks about 15 months later and then in nursing practice about caring for someone, all this nine months after being on a ward caring for someone with a heart attack.'*

Academic level was a major concern, primarily in the life sciences, where they felt disadvantaged by lack of 'A' level study. This did not seem to matter in social and behavioural sciences, where they could gain high marks in assignments without previous knowledge of the subjects. However, it was the sheer volume of content, most of which seemed largely irrelevant, that seemed to cause the greatest stress.

> *'We have had the degree lecturer teaching us, who just gives us the same stuff at the same depth. I mean how thick was that thing [study guide] on the liver, 100 pages? . . . Do we need to do all that? . . . But we don't do the basics . . . we seem to do things in too much depth instead of just knowing how the basic functions work.'*

> *'We never need to calculate the glomerular filtration rate, but he spent a whole hour teaching us.'*

> *'I never felt I got one system straight, we were always starting something new.'*

Although some lecturers were now trying to do something about it, the students still had the problem of not knowing how much they should know nor what would be needed for the final examination.

> *'. . . and when I start revision for the exams I feel I really need to know this in depth (life sciences) and in the exam all they really wanted was the basic thing.'*

Many students failed to pay attention to content which seemed irrelevant at the time, then later regretted this.

> *'In the CFP I did not realise the importance of what was being said. I didn't pay a lot of attention because it went way over my head . . . but now going through the branch I can see where it links up . . . It really*

> *needs to be stressed to future students . . . I missed an awful lot I could have gained.'*

Several students expressed the view that, during the CFP in particular, little recognition was given to the fact that they were on a nursing diploma programme. The depth and level of teaching was often inappropriate, and little cognisance was paid to the stresses and demands of nursing and how this might affect their outlook.

> *'I think it is quite hard for the university lecturers to scale it down for the nurses, we are doing so many things all the time, so many bits of the programme; and you are working at the same time, doing shifts, people are dying and you have to cope with that as well. You have so many emotions and you are tired . . . things you haven't dealt with before like laying someone out, that affects the way you come into school.'*

The adult branch

The students were generally more positive about the branch programmes than the CFP. This may be related to the fact they have much greater clinical involvement and feel more like nurses.

> *'I have got this feeling that this second part of the programme is going to make more sense. I think initially when we were in school for such a long time . . . but thinking about it we've got the basics, but now we are going back over it in a way but having more given to us. I find the lecturers a bit more approachable because at first they would keep on talking about nursing and when I was on the wards, and I would think "oh no" but now I feel that they are nurses and if I have got a problem I can go to them.'*

Equally they have already achieved a significant step forward as entry to the branch is by successful completion of CFP examinations.

As in CFP the quality, nature and organisation of the teaching was of concern. Students valued and were able to articulate what they had learned in some areas but not others.

> *'I think I have the understanding of how life threatening coming into hospital could be and how it would make peoples' reactions different . . . I think a lot of the psychology part of the programme has been really valuable.'*

> *'I can't remember very much about that [oedema] but that's why as far as I am concerned, a nurse's care doesn't depend on her biological knowledge because I have no complaints about my nursing care or about my knowledge on the ward. Couldn't tell you half of what the lecture was about because it was the most boring old (man) ever. He just stood there and said this and that. They don't explain it or relate it to your work.'*

As in CFP the manner in which subjects were taught and lecturers' personal style had an impact on learning; group size and the flow or fragmentation of the sessions were also important.

> *'You get little bits of knowledge, but the practice you put it to doesn't come till later. You give an injection and six months later you get a lecture on it – but it wasn't very good – a huge group with one teacher and the*

> *regulation orange. Do we do it this way? On the ward you get such conflicting answers . . . it never was clarified.'*

> *'There are some glaringly obvious things that we come across day after day that should be in the first few months. It's frustrating to turn up for a lecture and think, "hang on, I've already done this on the wards". There is nothing wrong with the lectures, just the timing.'*

A key complaint was about the conflict between theory in lectures and practice in the clinical area. This was noted by all students and included practical, attitudinal and structural issues.

> *'This named nurse thing – the NHS, they don't want people building therapeutic relationships with clients, they just want to clear the waiting lists and get them patched up and out again.'*

Mental health branch

Students in the mental health branch all commented on the cultural change and positive benefits of being in a smaller group.

> *'The whole atmosphere is much better. Because of the smaller group, the lecturers get to know the students better . . . they are more approachable you are able to speak out more and they are able to relate it more to practice (in the classroom).'*

However not all things in the branch were so positive.

> *'I don't think they listen to students enough, they tell you things are not in tablets of stone but when you do try to get things changed, well it never happens.'*

> *'I would have preferred a more structured course – you do sometimes feel you are lacking in knowledge. You are not being spoon-fed information because it is so self directed, it is up to you.'*

Some teaching issues were similar across the branches, for example of timing and fragmentation. The selection of content was also challenged:

> *'There was lots of self awareness stuff – you had to do everything, dance, drama, art therapy, couldn't see any point in some of it. We could have done with more on the psychiatry, we know it is the medical model but when you're working with it you need to know it. I don't think we had enough on nursing theory, there was a big gap and then another few weeks. In exams we had nursing models and we hadn't really covered it enough.'*

Teaching was generally regarded as better than that in CFP, especially in the life sciences:

> *'We had a good tutor who was willing to explain things . . . if you didn't get the gist of it at least you could read it up afterwards . . . Life science in branch was OK but in CFP it was horrendous. Being in smaller groups, and having the person we had, you could ask him a question without being shouted at; and he asked do you understand, are you clear . . . If you did ask in CFP with 120 people you were made to look a fool.'*

However, the lack of structure allowed an idealised view of practice to prevail unchallenged:

> *'There is an enormous gap between what you learn in school – it doesn't seem to bear any relationship to practice. As you come out and work by yourself you are on your own and they (school staff) talk about the ideal and in practice it is not like that . . . you were expecting to do all this dynamic hot stuff but a lot depends on your caseload; and when it is not like that, you feel you are not doing enough or the right things.'*

Personal tutors were assigned to students but their role was not clear nor seen as particularly helpful.

> *'They are nice people but it is very hard to get to see them . . . Some people use them, some don't. When I was going through a bad patch I could have done with some help, but you can't get an appointment – there are too many students.'*

Student perspectives on clinical experience

Our prime interest in students' clinical experience was the extent to which it enhanced understanding of the significance and relevance of discipline-based knowledge, and helped students to interpret and use that knowledge in practice.

The main problem in conducting an evaluation of this kind is that there is little sympathy in service settings for this central part of the programme rationale. With notable exceptions qualified staff interpreted the role of the nurse and the purpose of training in terms of coping with nursing tasks, for which most discipline-based knowledge was seen as unnecessary. Students did not necessarily agree, but felt that their acceptance by the ward team depended on their task competence and that this would dominate their assessment. Their confidence depended on being viewed positively, and they were unlikely to pursue more ambitious learning objectives until they had acquired that confidence, unless specifically encouraged to do so by their preceptors. Every student interviewed said that on occasions they felt foolish for not knowing simple things. This undermined their confidence and made them very selective in asking questions in case they were labelled as 'dim' or 'troublesome' students. The major threat to their confidence was not being able to do 'tasks' such as take temperatures, blood pressures, and catheter care.

> *'The emphasis is still placed on the tasks when you get out on the ward, can you do this and that, not how do you go about it, treat a client who is tired.'*

Student accounts of their clinical experience were dominated by their struggle to gain competence and acceptance. Placements were regarded as a lottery because of the diversity of settings, staff attitudes and support. The distribution of experience was inequitable, affecting what they could learn and how the sequencing of their experience affected their learning.

If a student went to a non-acute setting first they felt this adversely affected their subsequent learning because of the expectations of the staff assessing them. For example, a second placement student who could not take a blood pressure felt she would be marked down in her assessment.

> *'I was on an elderly ward and so I haven't done those things so I am lower than others at the same stage of training. There is no account made of that . . . it makes you feel small, silly . . . it undermines your confidence.'*

Student criteria for judging placements can be summarised as follows:

- Does the placement offer the experience I need at this stage?
- Do the staff have reasonable expectations of students at my stage and level?
- Can I ask questions and get the help I need without being seen as a nuisance?
- Do staff, especially preceptors and managers, accept responsibility for supporting my learning?

Variation increases as the questions progress, with the most strongly positive and negative comments referring to learning support. While most comments referred to individuals:

> *'Some [preceptors] are really keen, some have a student and really enjoy it and enjoy teaching and others cannot be bothered to try.'*
>
> *'I expected her to spend at least one minute with me so I could be sure I was doing it right [but] she just left me there . . . I felt dumped in the middle of a river, not knowing how to swim.'*

There were good positive examples where the organisation and management of the ward as a learning environment transformed the quality of support:

> *'They had a student pack with things like the days doctors came round, operation and preparation and that was really helpful and made you feel like here is a place where they know what to do with students and are aware of teaching.'*
>
> *'They wrote up on the board – if any dressings are to be done, take student X with you.'*

The mental health branch presented rather different problems. Students chose their own clients/placements but felt lacking in information and advice to make the best choices in terms of varied experience. They also had enormous anxieties about harming clients because the organisation of appropriate supervision was complex, time consuming and often at a distance.

> *'I just felt I was very much on my own . . . am I doing the right thing . . . you are not linked to a ward and nobody oversees what you are doing with a client, so you only have your own notes to go on and what you choose to tell your supervisor.'*

Students had to be very proactive in getting advice:

> *'I don't know what other people's supervisors did, I would go through them [clients] and single out those I wanted advice on or maybe something I had done or said that I didn't think was right. I think she found it useful she gave me nice marks.'*

In general, there was a perception that assessment was subjective and did not necessarily reflect their skills or practice.

> *'If you get an assessor who doesn't like you, you spend your time trying to get on or avoid her; but if you hit it off it is good, they write an honest truthful assessment, not to say it's gleaming but it's vital.'*
>
> *'I know someone whose assessor puts down opposite shifts so she doesn't have to work with them.'*

Clinical experience also led to some criticisms. In particular, lecturers in the school should take into account the reality of the placement contexts and provide more practical preparation for it.

> *'We definitely need more on nursing practice about basic things like what we do, temperatures, injections, it's like feeding pumps – you've never seen them before, the ward staff are supposed to show you but they don't realise that and we don't so nothing happens.'*

The planning and timing of teaching sessions was a cause for concern; students identified that in practice they were running before they could walk and the implications this had for their learning and clinical practice. On the other hand, they valued the emphasis on nursing orientation and interpersonal skills, often contrasting the 'theoretical' approach in this area favourably with what they observed in practice.

> *'It's just so different the way you treat them [clients] we'll sit and talk whereas they won't [staff nurse]. If she [client] wants to sit and talk to me I'd rather sit there but the others [qualified nurses] flap round all the work that has got to be done.'*

Many felt themselves to be much more able in this area than qualified staff.

> *'Other members of staff haven't had our training on the psychological aspects of care – you can recognise states or phases people are going through . . . but the old school trained it's so different the way they treat them.'*

They were concerned on occasions about the knowledge base of the nurses acting as their role models and assessors:

> *'She asked the staff nurse on the ward to explain and she said she had no idea what it was . . . if they are supposed to be our role models how are we supposed to learn if their knowledge is lacking.'*

But they also became more self-sufficient towards the end of the programme:

> *'Someone came in with an Addison's crisis and I hadn't got a clue what that was but I looked after him. I went away and looked it up afterwards.'*

> *'We are much more confident now and can judge peoples' reactions. You are assessing them on the wards and not just suggesting how to deal with their problem but go ahead and get on and do it.'*

It was difficult to get positive statements about learning in the clinical situation which was not task-oriented. Those we did get were almost all related to clinical lecturers coming to the wards.

> *'It was the clinical lecturer who linked it all together [knowledge with practice] she bombarded me with questions after this client came back from theatre like what are you looking for, why are you doing that, why are you doing the BP. It really made me think. I actually knew the answers and it made me realise I wasn't as thick as I thought.'*

Their only complaint was that they occurred very rarely. Of those interviewed who were coming to the end of their adult programme only one could recall as many as three occasions. One positive statement related to an ENT ward:

> *'They were very willing to teach all the time, specifically on a Friday lunchtime the consultant from the ENT department would come down and take all the students off the ward. I mean there could be up to 12 students working on the ward . . . but they would take all the students off and give them a teaching session on something.'*

When this student was asked about being taught by a nurse, the response was:

> *'We had one good teaching session given to us by a nurse – basically on catheters – and that was very good. Explained everything about catheter care, why catheters were used and completely covered the subject.'*

Comments about learning in the clinical environment were generally quite negative; a recurring theme was that it depended where and with whom they were working. One reassuring point, however, was an oft repeated comment that it made a difference if they worked with a nurse who had completed the DipHE programme.

> *'They will say what do you think and why do you think – what would you do in this situation, you know. They value your opinion – even if you might be slightly wrong, they will say well think again.'*

When asking about client-centred teaching by clinical staff the interviewer could not elicit any positive response:

> *'Not specifically where the nurse has said right I am going to do a teaching session on this client. I have not encountered anything like that.'*

> *'I wasn't actually told anything . . . and when I asked questions, it was mostly "I'll tell you later", and they would rush off and do what they were doing.'*

It was so difficult to elicit positive statements about clinical learning that students were asked how links were made between what was taught in the classroom and the clinical areas. While those at the end of CFP were more concerned with the relevance of their education component:

> *'I find you get the theory in the classroom and you can't – it's all gobbledegook until you're on the clinic and you can actually relate to someone to see what's going on.'*

> *'Sometimes the gap between what you get in the classroom, you know, and actually coming across it in real life on the ward is quite big and then I find that – oh yes! – I do know this, and I have been through this but it doesn't spring to mind because it hasn't been re-enforced enough for me to actually sink in.'*

Students at the end of the adult branch were more inclined to see both education and practice learning as relevant, but far too separate:

> *'I think that is the one big problem between teaching that we get in the school – that it isn't carried out on the wards.'*

> *'In the main it's very separate. You've got the school and the lectures, and the ward and what you are learning on the ward; but for whatever reason, the link isn't being made.'*

One common response to the question: 'Do you think the clinical staff are sufficiently aware of the theory base which is being shared with you?' was:

> *'No, no. There are lots of them who are very biased which is very sad. You get fed up with defending the course. They say things like 'well the course isn't worth having anyway.'*

Supervision in mental health raised similar concerns about the attitude of some qualified staff, the differences in the knowledge base and values between traditionally trained staff and the students and the anxiety of some students that they might not be doing the right thing for their clients.

> *'Some key nurses are better than others at how they value your involvement and how much time they are prepared to set aside to help you. My experiences have been positive and invaluable with so much expertise.'*
>
> *'I found my supervision invaluable but, apart from my supervisor, the rest of the staff from the old system all thought it was rubbish and could not see what the benefit was. I think I value it more as a learner nurse than I did as a student.'*

Ward-based observation

The students observed were on rostered clinical service in the general surgical area during last 24 weeks of the adult branch. The wards were a relatively modern 'race track' style, with clients' rooms on the outer perimeter and service rooms in the centre. Each had accommodation for about 33 clients; they used what they described as 'team nursing' in which teams (two nurses) were allocated rooms so that each team had about the same number of clients. The unit was in process of moving into computerised care planning, but staff were still learning how to use the system, so students had little access to the computer.

Students were observed for a minimum of three hours and a maximum of four. For most of the time they did not work with or receive close supervision from their mentor; they confirmed that this was fairly typical.

When general information exchange was observed, such as at hand-over or after doctors' rounds, the information was very task oriented; most concerned what had been done and/or what had to be done. There was no evidence of any problem oriented approach to client care. No questions were put to students to ascertain whether they knew what was being referred to, nor did students ask any questions. It might be inferred that they knew everything being discussed, but on one occasion, handing over after the doctor's round, a mentor said to a student 'the client has had excision and suturing of pilonidal sinus which was to be irrigated' the conversation continued ' as you haven't seen this done I will show you today and then you can do it yourself tomorrow'. The researcher subsequently found that the student did not know what a pilonidal sinus was. Other information/instructions to students was extremely vague. For example, one woman had had stripping and ligation of varicose veins the previous day, so the student was told that the wound needed 'to be checked', but not how to check it or what to look for.

Client handling by the students was poor. They were awkward in moving and turning clients and in things like changing sheets. Little advice was given by mentors, not even simple practical things important to good client care, such as how to position a bottom sheet for changing when the client is in bed. These aspects of care that do not require a profound level of theory were all but ignored. The students appeared more dextrous in specific task activities such as checking blood glucose, emptying and changing drainage bags, but two of them breached the principles of cross infection.

On only one occasion was a mentor observed teaching a student. This occurred while washing and changing a client who had had surgery the previous day. She was quite ill and had numerous lines attached, one of which was a central venous pressure (CVP) line. The mentor asked the student what a CVP line was and why was it used. The discussion centred on cardiac function in relation to CVP. At no time was the CVP equipment referred to or shown, and the woman had the CVP in situ for reasons of fluid status not cardiac functioning.

There were many occasions when learning could have been facilitated by simply asking a question 'en passant' then asking students for their thoughts. This is difficult when students and preceptors do not work together most of the time, but in the opinion of the researchers, the wards were not too busy for this to happen for at least part of the shift.

During another observation period, an extremely competent staff nurse, who appeared knowledgeable about clients in her care and confident about their management, explained and taught nothing to the student for whom she acted as mentor, even though she knew why and for what the researcher was observing.

From general information about the care situation gleaned by questioning students and qualified staff and specific observation, it seemed that some clients had care plans but that they were frequently out of date. No instance of care plans being used in relation to care delivery was observed. When asked about this, one student said they were not used. It appeared that there was no systematic assessment of clients, as illustrated by the care plan of one elderly lady (two days out of date) who was going to theatre later in the day. She was blind – no mention was made of this in the care plan – and complaining of pain in her left hip; her left leg was oedematous from groin to toes but no mention was made of this in the care plan and no nursing intervention appeared to be being taken, for example to prevent pressure damage. When asked about the leg, the mentor knew of it but the student did not. One mentor was asked why she didn't take the student with her when she assessed clients. She replied that she did them all the time in her head, and that she tended to do them when she was doing things for clients. When asked what would happen if she wasn't doing anything for the client, she said the client would not get assessed.

One mentor was asked whether they knew what knowledge was being presented to students in the school, and, if so, how. The reply was that they picked it up from the students.

The whole climate during the period of observation appeared to be indifferent to learning. There were many opportunities for students to have been taught or put in potential learning situations: when consultant rounds were done, students did not accompany them. This point was made to one student whose response was 'No, we do not go near when doctors are about – there is not time'. This was said when the student was hanging around waiting for the doctors to finish with his client. When the doctor and mentor came from behind the curtains no comment was made to the student about the medical opinion. The urimeter of this client was overflowing and the mentor stressed how important it was to monitor it appropriately and how important it was to monitor that this client was having a good diuresis. The student was not asked why this should be important. The client had been ordered a gentamycin infusion which the mentor prepared and added to the central line but again there was no discussion about this intervention or what the student might observe for.

On a number of occasions the researchers undertook the facilitation of student learning in a fairly minor way. The students' openness to being asked questions and willingness to try to work out answers were reassuring. They had substantial knowledge but needed facilitation in order to use it practice. Student responses such as 'you wouldn't like to come and do some more research here would you?' and 'it's so good to be asked questions, it really helps you to think about what you are doing' leads one to suspect that any effort by preceptors to help students to learn would be well rewarded. As we were conducting observation rather than an audit we did not feel it appropriate to question the mentors about the lack of student teaching.

3.6 Four mini studies: the teaching of life sciences and the use of biological knowledge

Mini Study 1: the teaching of biological sciences on a second DipHE nursing programme

Introduction

A distinctive feature of this programme is that biological sciences are taught only by nurse lecturers who have or are undertaking graduate and/or postgraduate studies in this field. The nursing care of clients suffering from the various disorders is taught by a different group of lecturers.

CFP:	97.5 hours; emphasis on normal healthy people, use of practical work to support theory and illustrate its application
Adult branch:	101.5 hours; emphasis on pathophysiology in preparation for the teaching of nursing care – considerable effort made to 'marry' teaching in life sciences with that in the caring skills theme
Mental health branch:	31 hours

Figure 14: Allocation of the biological sciences programme

This study was based on 18 hours observation of teaching: five CFP lectures, four two-hour practicals; five hours of adult branch lectures. Informal discussions were held with programme lecturers and programme documents were studied.

Teaching: Common foundation programme

Theory is taught in lead lectures, usually of one-hour, followed by practical sessions conducted in the laboratory, usually of two-hours. Lead sessions are conducted in a tiered lecture theatre, generally to about 90 students, normally following the classical pattern of lecturer-led exposition with occasional non-directed questions. There is copious use of the OHP and occasional use of video material; use of handout material was variable, but a number of lecturers frequently referred to recommended texts.

Most lecturers seemed less confident when teaching 'pure' theory than when teaching theory applied to nursing tasks. However, several sought to apply the material they were teaching to the clinical context e.g.

> In teaching the interstitial circulation the lecturer asked if students knew what oedema was; most appeared to. She explained that if tissue fluid was not returned to the circulation, its accumulation in the tissues could cause problems, and said this was a big problem if it occurs in the lungs – pulmonary oedema. 'What do you think will happen? Do you think you could breathe?' They get very breathless and this affects eating, walking and can be a major problem for clients with heart failure.

One exceptional lecturer asked a wide range of questions aimed at getting students to think about the material and develop/apply logical thinking to what she was saying e.g.

> In discussing respiratory functioning and commenting on the dead space, she asked: 'How could we reduce the dead space?' 'What happens to the dead space if we put a client on a ventilator?' She then related this principle about the dead space to snorkelling and discussed its consequences there.

This approach seemed to make the material more relevant to the students, as well as prompting rational/logical thinking. The practical sessions observed covered dissecting a heart (pig), taking blood pressure, measuring peak flow and assessing lung volume, and the ABO blood group system. All used handout material specifically, and included formal teaching, usually at the beginning to introduce the subject and at the end to pull findings together and draw conclusions. Discussion tended to involve a lecturer with one to three students and focus on specific issues raised by the students. All practicals appeared to go extremely well, with a high level of commitment from students and lecturers. Two 'findings sessions' on respiratory measurement and ABO blood grouping were used to compare the relative consistency of scientific findings (ABO grouping if the test is done properly) with situations where human functioning is concerned. For example, in respiratory measurements, it was demonstrated that not only do individual differences reduce the consistency of findings but even within one individual, these findings will change with a change in position.

The approach of lead lectures followed by practical sessions continued for four terms; in terms five and six students had 'observation/participation periods', in which they had four small sessions related to child health, mental health, learning disability and adult health, and were introduced to pain, pathology and pharmacology.

Not all teaching lends itself to this close linking of theory and practice; students undertake practical sessions on lifting and moving before being introduced to the musculature of the pelvic floor, but this is for health and safety reasons. Also, they are introduced to the concept of temperature and homoeostasis in the first term, but taught to take and record temperature in the following term when it is linked to the taking and recording of blood pressure in clinical practice. However, throughout the CFP linkage with the caring skills theme is pursued whenever practicable; for example micro biology in the life sciences is married with the practice of preventing cross infection.

Teaching: Adult branch programme

The adult branch is five terms long, and the main emphasis is on pathophysiology; there is some advanced physiology where it was felt inappropriate to include this in the CFP, for example the renin-angiotensin system and the mechanisms of the pelvic floor. A series of four one-hour linked lectures was observed, incorporating two sessions on blood pressure homoeostasis, one on tissue hypoxia and one on peripheral vascular disease.

The first session on blood pressure reviewed normal blood pressure homoeostasis; the second looked at broader regulatory factors and general factors influencing blood pressure. For example:

> 'When we record a blood pressure on admission what are we trying to find out?' The lecturer then used the points she had been making about anxiety and blood pressure to suggest that students may need to let clients settle down before they take and record a baseline pressure.

Most of this session was on hypotension, postural and syncopal attacks. When hypertension was covered, more time was devoted to primary hypertension – for which little primary nursing intervention is available, than secondary hypertension for which there is much valuable primary nursing intervention. However, secondary hypertension was also discussed in a later session on renal pathophysiology. There was no obvious linkage from the discussion of normal blood pressure homoeostasis to factors which could result in hypertension.

The session on tissue hypoxia introduced the classical four categories of hypoxia to identify the available situations, then concentrated on ischaemic hypoxia and the common arterial factors which cause it, in preparation for the session on peripheral vascular disease.

The session on peripheral vascular disease was in many ways the highlight of the series, but one hour was too little time to introduce this huge subject and attempt to discuss some of the nursing issues. The lecturer had recently left the ward to become a full time lecturer and demonstrated great clinical expertise and confidence; he wanted to ask more questions than he did and would have liked to give students longer to think through the issues, but felt the pressure of time. He referred to and used factors introduced in the session on tissue hypoxia, and these two sessions showed the benefits of co-operative teaching preparation.

Issues raised

The investment in developing a more relevant approach to teaching biology, supported by practical work, clearly paid off in terms of student motivation. Using nurse lecturers helped to ensure its relevance and continuity with later adult branch teaching.

Even with a strong life sciences component, there was evidence of lack of time putting pressure on the selection of material in the adult branch, and possibly upsetting the balance between explaining pathophysiology and discussing its implications for nursing practice.

Mini Study 2: use of biological knowledge by DipHE students on an adult surgical ward

This study set out to explore students' use of biological knowledge in practice. Six students were observed for three hours on an adult surgical ward; they carried out assigned tasks on their own or jointly with their mentors or other qualified staff. This observation was followed by a 45 minute interview to discuss the biological knowledge which informed their actions.

All six students were studying on the adult branch of a DipHE programme: two had just begun their branch programme, two had just started rostered service and two had almost completed the programme. All had received theoretical input in biological sciences during their CFP, but varied in subsequent input according to the stage they had reached in their training; nevertheless they were allocated very similar tasks. Task allocation appeared to depend not on the experience of the student but on that of the qualified nurses; when fewer were on duty, students were given more responsibilities without ascertaining if they had the necessary knowledge or experience. Tasks undertaken by the students which required a biological knowledge base are listed in Figure 15.

Changing intravenous infusion/fluid monitoring *
Injection IM/SC *
Giving bed pans *
Nutritional supplements
Setting nebuliser/oxygen administration
Carrying out observations; routine/post-operative *
Managing pain *
Ileostomy care
Bed baths/mouthcare/eye care *
Wound Dressing
Total care of unconscious client
Blood sugar monitoring (BM test) *
Pre-operative physical preparation
Removal of drains
Bed making *
Barrier nursing
Care of naso-gastric tube
Care of T-Tube
Epidurals in post op clients
Administration of drugs *

Figure 15: Tasks undertaken by students which require a biological knowledge base

Some tasks (marked *) were carried out by all students, many on several occasions.

Given the time constraints, the post-observation interviews focused on three areas of biological knowledge selected by the project: pain, shock, and fluids and electrolytes.

Pain

All students were involved in caring for clients receiving pain control. Analgesics (morphine or pethidine) were administered via continuous infusion, intermittent injections or epidurals. The rate of infusion was checked by the students to ensure the correct rate was being administered. There were no records of any systematic method of pain assessment and effectiveness was assumed if the client did not complain of pain. The students' assessment of pain was based on the surgery clients had received, rather than on direct evidence, as illustrated by the following cases.

> **Case 1:** The client had a left above-knee amputation; the stump had failed to heal completely and a fistula had formed which required daily dressings. The client complained of pain in the healed part of the stump. The student failed to recognise that nerve endings continue to grow in stumps and that despite complete healing having taken place it was possible for the client to suffer from acute pain. This was confirmed during the interview when the student did not know that nerves could grow but was aware of 'phantom pain'.

Case 2: This client had undergone a transfemoral arteriogram (TFA) for an ischaemic limb and was confined to bed rest for 24 hours. During bed bath, he was asked if he had any pain from the TFA; although, he was receiving regular medication to control ischaemic pain, no attempt was made to make a complete assessment of his pain. The students were unable to identify what alternative methods might be available to control the ischaemic pain other than giving prescribed analgesia.

These studies demonstrate that the students were only able to recognise surgical pain, had limited knowledge of nerve pathways and were unable to assess clients' pain or offer effective relief. They knew some factors which influence pain, but pain was managed in a stereotypical manner rather than as a planned individualised intervention; so that post-surgical patients were liable to suffer unnecessary pain (Sofaer, 1984).

Shock – observation of vital signs in post-operative clients

All students appeared to be competent at taking and recording vital signs in the post-operative period, and knew why they were performing them. There was evidence that they would have recognised clients who were haemorrhaging and developing hypovolaemic shock by noting a rise in their pulse rate and a simultaneous drop in their blood pressure (excluding the effect of anaesthetic drugs), but other signs of shock were not mentioned.

When asked how they would respond on finding such a client, all students indicated they would inform the ward manager and doctor, so that immediate action could be taken. During the observation, two students elevated the foot of the bed with the client lying flat; they could not give a reason except that they had seen qualified staff intervene in that way when clients developed low blood pressure despite other signs being normal. None were able to explain the physiological changes resulting from loss of blood and how fluid replacement would restore the circulation, but they did indicate that the client would require more fluid such as blood or 'plasma expanders'. Treatment for hypovolaemic shock was even less clearly understood, and some confusion was present because of their inability to understand how the drugs worked.

Overall, their knowledge of the circulatory system was limited for the tasks they were performing; few could recall information relating to stroke volume, cardiac output, end-diastolic volume, Starling's law or baro receptors – all essential concepts in the management of shock. They could not describe how colloids influenced blood pressure or why they were given in preference to crystalloids. It was also evident from the following case study that tasks and observations were carried out as routine tasks without understanding the implications for the client.

Case 3: A 70 year old man had suffered a cerebro-vascular accident (stroke) whilst awaiting surgery for poor blood circulation in the legs. He was described as 'poorly'; he was unconscious, had right-sided paralysis and had developed an irregular pulse and a pyrexia of 39°C. He was also receiving oxygen via nasal cannula. This client was cared for jointly by a qualified nurse and a senior student. At the start of the bed bath, the oxygen flow through the nasal cannula was discontinued; oxygen was reconnected after almost half an hour following all nursing care. Observation of his pulse and blood pressure were recorded during that time and despite his pyrexia no interventions were substituted. No respiratory assessments were made even though the client was receiving oxygen and had a 'bubbly' chest. His urinary catheter bag was checked to see if it required emptying. The total fluid input and output or accumulated fluid gain or deficit was ignored as far as could be ascertained.

This case study illustrates that care was delivered in a routine manner without regard to the client's changing needs. It is normal practice on this ward for nurses not to make respiratory assessments on post-surgical clients, but it can be argued that in the above case, there was a need to undertake that observation. The discontinuation of the oxygen indicated that the nurses did not apply their knowledge of respiratory physiology. Later at interview the student admitted that it was essential to have undertaken the respiratory assessments and taken steps to reduce his temperature.

It appears that although students had some knowledge of the biological sciences related to the circulatory and respiratory system, this was not used in practice. Few guidelines are available for students on the frequency with which observations should be recorded, so it is left to their judgement – understanding the physiological principles involved is therefore of paramount importance.

Fluid and electrolytes

In the immediate post-operative period, all clients received intravenous infusions to maintain hydration and homoeostasis. The students were involved in ensuring infusions were running, but no attempt was made to monitor clients' fluid status. None of the infusions were being administered at the prescribed rate and upon questioning, it became clear that none of the students could work out the flow rate; as long as the fluid was dripping in the chamber, it was deemed acceptable.

The students had limited knowledge regarding recognition of acute fluid overload. Only one of the six could list five signs and symptoms, with the majority only able to identify oedema and increased urine output; none could identify the immediate signs such as pulmonary oedema, raised jugular venous pressure, breathlessness, dyspnoea, tachycardia, restlessness and distress.

Students demonstrated even less knowledge of the clinical effects of dehydration. Only late signs of dehydration were mentioned and complaints of thirst were ignored on two occasions and with no further assessments made to judge fluid status. Those who mentioned 'high temperature' could not explain the mechanism involved; it became clear that knowledge of the electrolytes concerned was non existent.

Clients were regularly told to drink plenty. When asked to clarify, the students said the clients 'knew what we were aiming for', although no evidence of clients demonstrating that understanding was observed.

All students were seen emptying urinary catheters or disposing of urine on many occasions. The fluid output was religiously recorded on the charts, but little attention paid to client's overall fluid status. The 24-hour total was rarely considered and the overall balance did not appear to have been maintained or discussed. Fluid input and output was examined in isolation. Terms such as 'urine output is good', and 'IV' were regularly mentioned with no mention of volumes which would have been a more objective criteria for assessing fluid status of clients.

Mini Study 3: the CFP life sciences programme on a third DipHE programme

This study investigated the views of 30 students nearing the end of their CFP on the appropriateness and utility of the applied life sciences component. The context was a multi-site institute of nursing linked to two local universities. Evidence was collected from curriculum documents, written evaluations by students and lecturers, a student questionnaire and interviews with students and lecturers.

95% of the students stated within the questionnaire that they felt:

> *'It [applied life sciences] would help knowing how the body works, knowing what bit is wrong, particularly with adult nursing it is important to understand things'.*

These statements formed the initial questions for the interviews, where students were asked to elaborate on why they life sciences were important. Varied responses were received but predominant was the notion that knowing the life sciences would enable them to:

> *'. . . understand the words better, how the doctors spoke, the hand-overs and the diagnosis.'*

Others commentated that they had a clearer understanding of

> *'. . . how the illness affects the client'; they knew if the client was 'coughing or wheezing then the lungs were involved.'*

The students felt it was important to be able to recognise individual's 'illness', whether they were in pain, had a temperature or 'something had changed'. Four did not know why the life sciences must be important because nurses looked after people ill in hospital and they were being taught these topics as part of the programme.

The students were asked to describe how useful the taught sessions had been in their practice setting. Many had made comments such as:

> *'How will that help me to care?'*
>
> *'. . . don't know what all the science has to do with nursing.'*
>
> *'. . . it helps me to understand the doctors notes but not our nursing.'*

In contrast, those who had done 'bank work' felt it was useful as they were familiar with the ward setting, had an idea what they were doing and could recognise some of the language used.

In interviews, the students described in great detail the 'nursing' they had done: 'helped somebody to wash, got this lady up and checked her pressure areas', but their descriptions tended to be of 'tasks' completed for a client, in contrast to their questionnaire responses, in which they had described life sciences as helping them to give 'holistic care'. When asked for greater detail, such as: 'What are you looking for when you check a client's pressure areas?' a mixed response was given with most referring to the colour of the skin: 'if the skin looks red then I'd tell someone'.

Many of the students talked of 'watching' what others did and then in a similar situation copying them. The similar situation was clarified as being a 'client with the same illness' whilst watching may not have occurred during the programme. Many students work on the hospital 'bank' or in other settings to supplement their bursaries. Referring to her 'bank work', one said:

> *'I'm doing a lot of bank work and there you just get on and do things such as turning and looking for red areas . . . so I just do the same when I'm here as a student.'*

Whilst another admitted:

> *'I don't know what I'm doing . . . I feel like I'm just bumbling along hoping that what I do is all right, I don't think I'm nursing yet.'*

Another student discussed how in her practice she would 'care for drips, drains and things you know', and when explaining how she knew what to do again referred to her 'bank work':

> *'Well I'd done some bank work and when the drip stopped dripping I knew it wasn't working . . . and so when I was caring for the intravenous infusion I'd look at the bag and if I couldn't see it dripping I'd think something was wrong.'*

The student was unable to consider any other reasons why the infusion may not have been working. Others were able to describe some aspects of physiology, as with oedema, but were less clear how this would help them decide on nursing actions; one said:

> *'. . . you just get on with things you know . . . and then later you think . . . oh yes it was because . . .'*

> *'. . . you see one nurse put their legs on a stool, so you think next time I have someone with oedematous legs I'll put them on a stool.'*

The student continued by explaining oedema, describing 'poor venous return' and conditions such as 'heart failure' as potentially leading to oedema, but when asked how putting client's legs on a stool would help their oedema the student was less clear and was also unable to describe any other nursing actions which might reduce oedema.

It was clear that the students felt life sciences were not utilised in their initial placements – children, mother and baby and community. In contrast to their sociological, psychological components which: 'helped us to communicate – understand what it means to live alone'.

Although in one placement ('handicapped'), students were presented with 'altered' normality (Down's syndrome), they saw this in terms of the 'psychological and sociological development'; although one commented on how it was 'interesting to see a genetic disorder' the main concerns were 'how would I feel', 'what if I can't communicate'.

From the interviews it emerged that students felt the theoretical input was of most use when it directly related to an experience or was validated by 'testing within the programme'. Towards the end of the CFP students stated they tended to focus on information needed to complete their course work. At this stage they expressed a mixture of concern and relief that applied life sciences were not directly assessed. They appeared to feel that the volume of input was not validated by the course work. Referring to the examination, several commented:

> *'We didn't really need all that information . . . I could answer the questions without using much of the biology . . . it wasn't needed so I didn't learn all that much.'*

Knowledge and practice

During the interviews the students were asked to reflect on their practice that day and consider what knowledge they used to guide it. The replies fell into three categories:

1. Didn't try to understand what was happening or felt unable to describe what knowledge they were using in practice.
2. Felt they were using some knowledge but then were unable to make the link between their knowledge and their practice.
3. Felt that using knowledge in practice is important and subsequently would consider their actions retrospectively and study at home to make sense of the situation.

One student felt that other students needed to be told that they must study in practice time, and that this was their responsibility. He was critical of the programme in that it assumed the students would 'know' this. The students during this period were 'supernumerary', which appeared to have different meanings to different students. Reviewing the continuous assessment documents it appeared that some were encouraged to be involved whilst others were not and had to 'watch'. One student, commenting on her preceptor, said she was always 'rushing' so when the student asked questions there was no time to answer; the student felt uncomfortable within the wards and felt she did not have the advantages of 'doing bank work or working as an auxiliary' before she started.

The students' relationship with preceptors had mixed reactions, some felt their preceptor was:

> *'Very helpful and would answer my questions . . . obviously knew what they were doing as it was difficult to keep stopping them to ask things . . . sometimes if I ask a question they say they will explain later . . . but they never do because they are so busy.'*

The students all felt that, even if they did not know what they were doing and why, the preceptors:

> *'. . . must know what they are doing . . . must be using some knowledge, but they just don't say what . . . they must know what they are doing because they have seen these things before.'*

In contrast another student stated how important he felt it was to really understand how the body worked and all the treatments so that you could think about what you were doing but continued by saying:

> *'It's important to be able to get on and do things and then ask the preceptor what was happening.'*

The idea that in the practice setting the students had to be able to get on with things was prevalent within most interviews, with the students using a variety of 'coping' strategies. Some 'bumbled through', other 'watched and then copied', only a minority tried to rationalise their actions with theory they had been taught. Students with no previous experience and were not working appeared to feel they were disadvantaged in their practice settings.

Life sciences as part of the programme

When asked how they felt the theme had been taught, the dominant student view was that 'too much was given too quickly'. They found the theme 'daunting, frightening and horrendous' when faced with the 'speed of the initial sessions'.

Comments were raised relating to the diversity of the contents between differing sessions:

> *'. . . the heart and lung was covered in an hour whilst we spent three hours on the skin . . . it seems that the sessions I thought would be important were very rushed whereas others we would spend hours on . . . nobody explained why, so I just thought it was how it was, but then so much was crammed in the short sessions that I just stopped listening, I couldn't cope . . . I couldn't understand all that chemistry or why it was needed, but then I thought don't worry if nobody asks then it'll be OK . . . I couldn't see how it would help me to nurse people.'*

For some of the students it was a relief that they felt the programme didn't directly test them on anatomy and physiology, although one felt strongly that this should have occurred. Some commented on how the level of the input varied between sessions.

Not surprisingly, the minutes of meetings revealed considerable debate over what constitutes 'diploma level'. Some lecturers refer to diploma as equating to the content . . . 'the greater the content the greater the qualification' whilst others refer to the 'understanding, ability to analyse, discuss and question findings'. The curriculum document quotes the CNAA handbook stating that for diploma status:

> *'. . . the educational process of a programme must encourage students in the development of an intellectual curiosity and must facilitate the growth of independent learning skills which will enable students to satisfy such curiosity.'*
>
> *'. . . the taught content of the programme must provide coverage in depth of the relevant theoretical base; grounding the programmes of study within the broader context and making reference to literature research, thus enabling students to develop an appropriate conceptual framework.'*

These somewhat vague statements do little to clarify the term 'diploma' or provide guidance as to what is 'depth' or 'appropriate' content. During the interviews many students stated that they were:

> *'. . . not clear what I'm supposed to know' and 'don't know what to learn . . . so I pick up a book like Tortora and read but then I don't understand and someone else says you should use Ross and Wilson.'*

Teaching intentions, written for each session, aim to give lecturers guidance into content and depth, but it is not made clear that there is parity between the sessions, as reflected by the students in their descriptions. Indeed the guidelines often conflict with the intentions of the curriculum, which refers to 'an introduction to the structure and function'.

Interviews with lecturers suggest there are diverse ways of using the teaching intentions. Some '. . . use them as a guideline . . . modifying the content to meet students' needs . . . or abilities'.

Whilst others stick rigidly to the content sheets, feeling that they have to get everything in '. . . sometimes the sessions are so rushed, trying to cover everything, it's so unrealistic'.

The students appear to recognise these differences, saying:

> *'. . . some just keep talking, with lots of handouts whilst others are able to answer questions and discuss areas.'*

In comparing the two campuses in unit one (CFP) the students felt that campus two was less 'rushed' although many commented that they had not been able to remember campus one 'because our placements had been all in the community and the knowledge wasn't needed.' This had been picked up through written evaluations of both campus periods when lecturers reported they had to repeat much of campus one and students reported that 'during our first placement we forgot everything, but it was repeated again', although some felt that in some lectures the emphasis was to 'cover what was intended . . . even if we didn't understand anything'.

Some students said that during campus two they thought they had not remembered anything from campus one, but during the sessions they 'remembered more'. They said there was less difference between the lectures and that it felt 'less rushed'. Predominantly, sessions in the second campus were given by less lecturers than in campus one, where all theme members taught, choosing their 'specialist topics'. One lecturer felt it was due to the logistics of running the programme and that during campus two a more 'generic' approach was adopted in order to 'cover the required sessions'.

Criticism was also made of some study days, e.g. pharmacology, with students commenting:

> *'All I wanted to know was how to give drugs and their side effects . . .*
> *What was the point of all that science . . . the day was a waste of time . . .*
> *knowing how a particular drug acts isn't going to help me.'*

Placing physiology in a nursing context

In theme meetings, much discussion had been devoted to whether life sciences should be taught in association with a nursing model or within the framework of a model. It was decided that within the CFP no nursing model would be used to enable students to be given the necessary 'breadth of knowledge'; instead a systems approach would be utilised. Teaching of biology associated-sciences within the context of a system is a traditional approach adopted in many educational settings, but the simplistic approach of dividing the body into areas does not recognise it as a system within a wider social/physiological concept; it reduces the complex into manageable 'chunks' but an understanding of the whole phenomenon is essential to the understanding of the individual systems. In the context of the applied life sciences, teaching remains predominantly within the traditional systems and fails to illustrate the individual and physiological influence one individual has on another. The exception is within the concept of stress when in identifying 'stressors' the student moves away from the individual. Several questionnaire respondents asked why wasn't it taught in a nursing context. The students appeared to need to be told how an aspect of physiology was applicable to nursing, and often their receptiveness depended on the clarity of this relevance.

Many lecturers also commented on how difficult it was teaching the life sciences in isolation from practice in the CFP:

> *'. . . you see in their eyes they are not really understanding the concepts or*
> *even why we are teaching them . . . so you look for a nursing illustration*
> *. . . but if they have never been in that situation it doesn't help their*
> *understanding.'*

Mini Study 4: the use of biological knowledge in caring for breathless clients by novice and advanced practitioners

This study was based on scenario-focused interviews with five newly qualified staff and six advanced practitioners. The former were in their first year of practice and working on medical wards; the latter F and G grade nurses working on cardiology or respiratory medical wards: five had ENB 998, two had taken advanced cardiothoracic programmes and one an advanced intensive care programme. Knowledge maps for respiration, similar to those developed by the project, were used in analysing the results.

There were four key findings from the interviews.

1. Assessment and care described by advanced practitioners was at a deeper level than that described by novice practitioners, both in accessing knowledge and in using it in the majority of situations.
2. Assessment and care described was of the type the researcher expected for a breathless client but the biological science knowledge underpinning it was not always accurate or at as deep a level as the researcher had expected.

3. There were differences in some areas between the advanced practitioners who had completed post-basic programmes in intensive or cardiothoracic nursing and those who had not. Differences lay in the accuracy of biological science knowledge and the level at which it was accessed; advanced practitioners tended to give more accurate answers that appeared to show more understanding of the biological sciences.

4. The majority of informants felt their knowledge of biological sciences came from their nurse training but did not make sense until late in their training or even until they were qualified. The post-basic programmes in intensive care and cardiothoracic nursing allowed advanced practitioners to revisit the biological sciences and make sense of them, as well as adding new knowledge which could be better understood from experiences already encountered. The presence of a good mentor was mentioned as helping to understand biological sciences in relation to client care.

Data gathered for the tables could be divided into three distinct categories according to the way the biological sciences were used.

1. Assessment of the client's respiratory status specifically.

2. A more general assessment, looking at the activities of living and how they were affected by the client's breathlessness or may have contributed to it.

3. The immediate nursing intervention carried out on and for the client.

In accessing and using the knowledge there was a distinct difference between novices and advanced practitioners. Novice practitioners generally accessed knowledge more at an 'appreciating the relevance' level and used it by simple application or situational adaptation, while advanced practitioners demonstrated understanding and interpretation of the information and used it more creatively.

One implication of this study is that advanced specialist programmes are extremely important in developing nurses' use of scientific knowledge. It may be unrealistic to expect sufficient expertise to be developed on pre-registration programmes alone. Of equal concern is the scarcity of this expertise: if students do not see knowledge of biological sciences being used in the clinical area or are not assisted to reflect on the care given by their mentors, they may not see the knowledge as valuable.

Difficulty with the biological sciences is also supported by the fact that all informants, except those who had taken ENB clinical courses, tended not to use technical language in describing the rationale behind their care. This supports Hayward and Akinsanya's (1982) findings regarding nurses' poor grasp of the basic vocabulary of the biological sciences, which may indicate difficulties in comprehension, but may also stem from nurses' need to talk to clients in a vocabulary they understand. However, it also means they will find it difficult to teach students and they may avoid this, again reinforcing that this knowledge is unimportant particularly if a student perceives the nurse as a 'good' nurse.

Novice practitioners adopted a recipe approach to their care; they were unable to give the rationale behind what they were doing. Since many were relatively newly qualified one could suggest their knowledge reflected that learnt from their training. Advanced practitioners on the other hand often referred to previous experience, supporting Ashworth and Longmate's (1993) proposal that theory formation tends to occur in situations where 'the normal, habitual and ordinary ways of acting do not succeed'.

3.7 Interpretation of the case studies

The potential for mediation in different contexts

Mediations can be usefully described in terms of:

- the curriculum slot in which they occur
- the prior knowledge and experience of the students
- the kind of emphasis given to them.

Where curriculum slots are sessions dedicated to teaching scientific knowledge, mediations are most likely to involve drawing attention to practical situations where the knowledge is needed for understanding and/or making appropriate interventions. The purpose may be simply to establish that an area of scientific knowledge is relevant, and therefore worth remembering. Sometimes, however, the mediation is more ambitious and the link is sufficiently explained and/or discussed to enhance students' understanding of the scientific knowledge and its use in those particular situations. The success of both these approaches to mediation depends on students having sufficient prior knowledge and experience to appreciate the links being made.

The effectiveness of mediations also depends on the pedagogic strategies employed. General principles relating to keeping listeners alert, active involvement of students and providing conceptual frameworks to structure and organise information are extremely important. These are easier to enact when the curriculum is well planned and coherent, and teaching groups are small and relatively homogenous.

While appropriate mediations from theory to practice are universally welcome on professional programmes where the value of scientific knowledge is normally judged by practice-oriented criteria, mediations from everyday practice to theory are rare. Practitioners do not often explain what they are doing or why; unless asked, it is taken for granted that their actions are normal, right and proper. Although explaining things to clients is an important part of the midwife's or nurse's role, such explanations are usually not at the level appropriate for students needing to understand how scientific knowledge underpins practice, so mediations by qualified staff must be imposed on top of their normal patterns of behaviour. Minimum level mediation involves drawing attention to relevant areas of scientific knowledge, which may be all that is needed. More ambitious mediation requires discussion to explain the link between particular areas of knowledge and the planning and delivery of care; its feasibility depends on the student having sufficient prior knowledge of the relevant theory to make the connection.

A third kind of mediation occurs during teaching sessions focused around an aspect of care; these may involve general principles being established then illustrated by reference to particular clients, or the care of a particular client or type of client being discussed and linked to general principles. Although these sessions are dedicated to linking principles and practice, there may not be more than a passing reference to the scientific knowledge underpinning them. Where scientific knowledge is incorporated into such discussions the opportunities for effective mediation are considerable. They often occur later in the programme, when prior knowledge and experience can be relied on, and the context is more appropriate for in-depth discussion of the use of scientific knowledge in practice than large lecture theatres or busy clinical settings.

The higher education context

Chapter 3.1 reviewed the incorporation of pre-registration programmes into higher education; all the phenomena described could be seen in the case studies:

- Teaching by a non-member of the profession often caused students to doubt the relevance of the content.
- Qualified nurse lecturers seeking to establish academic credentials sometimes felt obliged to compete with discipline-based colleagues in points per minute and technical vocabulary, not always to the advantage of their audience.
- Students' learning was strongly influenced by impending examinations.
- Modularisation often led to segmentation of knowledge, even within the discipline-based components of the programme.

The extent to which these problems are avoidable is discussed in Chapter 4.

The only programme which remained relatively free of these problems was Case Study 1, where a team of midwifery lecturers exercised control over the use of higher education and service-based staff, only using those who could be relied on to keep to their brief. We could not evaluate the total content of scientific knowledge in that programme, but our evidence strongly suggests that very little was superfluous, and a much higher proportion of the knowledge introduced was mediated into practical use than in any other programme studied. This may be easier to achieve in midwifery than nursing, because the knowledge-base is more focused, but the curriculum flexibility and priority given to mediating that knowledge was also greater, and the proximity of education and service settings enabled interactions that were impossible in Case Study 2.

Professional socialisation

Another important contextual dimension is the process of professional socialisation, which can be viewed sociologically and psychologically. Sociologists' prime concern has been the extent to which professional education reproduces the professional community (Atkinson, 1983). There is always tension between leading professionals, who aspire to raise their profession's status and standards of practice by increasing use of scientific knowledge, and ordinary practitioners whose defensive responses stem from their wish to do the job they have always known. This was demonstrated by the sceptical attitudes of some practitioners towards new forms of pre-registration programme. For student nurses there was also conflict between the 'normal health' rationale of the CFP, and the reality that most student nurses are training to care for those who are ill.

An interesting feature of Case Study 3 was that students gained confidence in psychological knowledge to the extent of feeling more capable of handling relationships with clients than some qualified staff, but did not acquire a similar level of confidence in biological knowledge. Mini Study Four suggests that qualified nurses do not become confident in biological knowledge until they have taken an advanced specialist qualification. Many students rationalised their limited knowledge by claiming that 'good' practitioners did not appear to need it. This does not augur well for students' post-qualification continuing professional development; in settings where the socialisation process is likely to reinforce these beliefs.

The psychological dimension of professional socialisation is revealed by the changing nature of student priorities. Students' first psychological priority seems to be to gain acceptance as legitimate, and at least partially competent, professionals in service settings. This external validation is of great psychological importance and can only be conferred by their acceptance as colleagues by qualified practitioners. Such acceptance depends on them being useful rather than inquisitive. The sooner they can be trusted to carry out a range of tasks, the sooner they will be accepted. While leading professional nurses are stressing that nursing care goes far beyond the performance of tasks within the competence range of a health care assistant, these so-called 'low level' competences provide the student's passport to acceptance. The problem is less significant in midwifery though even there students would have preferred to have acquired at least some practical skills before going out on placement.

Students give this need for validation of their career choice psychological priority over all other aspects of their education programmes. Scientific knowledge and even discussions about health policy will be subsidiary concerns until they feel accepted by authentic practitioners. While this kind of prioritisation can be counteracted by instituting discipline-based examinations which are difficult to pass, this approach does not encourage learning scientific knowledge in order to use it in practice, and may intensify feelings of resentment and inadequacy in a manner that bodes ill for continuing professional development after qualification. This issue is further discussed in Chapter 4.

Mediation while teaching scientific knowledge

Although the project rationale put great emphasis on learning to use scientific knowledge, the interpretation of our evidence requires us to consider the less ambitious goal of establishing the relevance of scientific knowledge to professional practice. The ultimate criterion for achieving this more modest goal would be evidence that during the latter part of their rostered service students would either recognise the relevance of scientific knowledge during practice or become aware, if asked to reflect but not otherwise prompted, of the scientific knowledge underpinning their decisions and actions. The project was in no position to conduct a blanket investigation of this kind, but it was able to study the kinds of mediations which took place and the later reactions of students to those mediations.

Interviews with students at the end of the CFP and half-way through the university-based midwifery programme (Case Study 2) made it clear that the socialisation process created a perceptual screen which determined students' learning priorities. Content perceived as relevant at the time was welcomed while that perceived as irrelevant was ignored. During the CFP, when the greatest time was given to teaching scientific knowledge, students had relatively little experience of practice on which to base these judgements of relevance. Unless there was some attempt at mediation and to actively engage students' interest, large areas of content were likely to be screened out by inattention or quickly forgotten. Analogous processes have been noted in non-professional higher education students (Miller, 1987) to cope with the information overload in many programmes, but this phenomenon takes longer to develop and is more assessment driven than application driven; the screening we observed started at the beginning of the programme.

The screening out process was strongest for intending mental health students; and student midwives sharing lectures with nursing students; neither group seemed to anticipate that their clients might sometimes be physically ill. Even the content allowed through the perceptual screen was likely to be soon forgotten if it was not soon encountered in practice settings within a few weeks. Many students reported forgetting knowledge that they did not quickly put into use, and staff described having to repeat content which had been previously taught because little learning had survived the other demands on students' attention. Several students expressed regret when they later began to realise that some of that forgotten knowledge had been relevant after all. Mediation at the awareness-raising level may be sufficient to prevent content from being screened out and to establish its presence in students' notes, but will not prevent it from being forgotten if it is not used. At best it becomes knowledge in store, rather than knowledge readily available for practical use. To make a more lasting impact on students, mediations must either involve sufficient discussion to establish relevance in a more permanent fashion or rely on early subsequent follow-up in practice settings.

Fieldwork evidence also suggests, however, that in some circumstances broader definitions of relevance will be accepted by students. Psychology lecturers were less dependent on students' direct experience of midwifery or nursing because they were able to link psychological concepts to students' own life experiences; it often required little imagination to extend that relevance to current or future clients. Practical work in biology also enabled students to concentrate on fewer ideas at one time, a privilege rarely accorded in lectures. Direct experience of seeing real objects, such as a heart or a placenta, and manipulating models such as a doll and pelvis, made content more relevant and easier to understand.

Incorporation into higher education

Apart from mediation, the amount of material covered in a session was an important influence on student understanding. High density sessions precluded much mediation and forced students to screen out material, when they did not necessarily know what was important to remember. This problem has been exacerbated by the incorporation of pre-registration programmes into higher education. Either disciplined-based higher education lecturers with no professional background teach programmes as if they were part of single-subject honours degrees, or nurse lecturers, uncertain about what constitutes diploma level, establish a similar academic level to that expected in other areas of higher education. Curriculum documents do not usually give sufficient guidance, so there are wide variations in the level of treatment accorded to scientific knowledge even within the same programme; this confuses students and lowers their confidence. Another problem can arise when higher education modes of structuring content do not lend themselves easily either to regular mediation or to the appropriate sequencing of theory and practice. These issues will be discussed in Chapter 4. Meanwhile we note that critical questions raised by students' responses to CFP include:

- Can the CFP rationale be made more compatible with students' psychological development through the socialisation process?
- Can the presentation of discipline-based knowledge be made more coherent and relevant by improved structuring and sequencing of taught modules and placements?
- Can the content be reduced sufficiently to allow sufficient mediation to occur?
- How can content priorities then be determined?
- How can content best be made comprehensible and relevant to students at the time it is taught?

Mediation in clinical settings

A great deal is expected of student learning in service settings, but there is little evidence that the expectations are met in the majority of contexts. In general the rationales and curriculum frameworks of new programmes are not well understood, and the brief for service-based learning is rarely clear. Even in midwifery, differences were reported between what lecturers think should be taught by mentors and what mentors think should have already been taught by lecturers. This kind of dispute did not occur in mental health, where the principal problem appeared to be the gap between the image of practice transmitted in the school and that experienced in clinical settings. In all three areas observed, the level of learning support provided by most mentors was significantly less than that envisaged by programme developers. Problems arose from insufficient contact between student and mentor, clinical management of students' and mentors' work, and the quality of mentoring itself.

The most incontrovertible evidence concerns the **time** spent by supervisors or mentors in direct observation of students, giving feedback, answering questions, discussing practice or coaching. In some placements contact time was very little; in mental health, students' main concern was the dearth of any opportunity to be observed with a client at all; in hospital settings, practitioners were often 'available to answer questions' but in practice too busy to give students special attention. Even when qualified practitioners worked alongside students, this was no guarantee that feedback or advice would be given or any discussion take place.

The 'pair of hands' syndrome appears to have been little affected by the introduction of supernumerary status. Students may observe more, but to what purpose and with what understanding? The observer role conflicts with students' psychological need for acceptance and the pedagogic principle of learning by doing. Without mentoring, however, learning by doing can easily become doing without learning, like the learning-by-copying behaviour developed by students who had done bank nursing in Mini Study 3.

Clinical management arrangements affected the nature of work students were expected to do, as well as opportunities for students to work with mentors or other qualified staff prepared to assume that role. Where problems arise, they can be attributed to the scheduling of placements or to clinical management arrangements within particular placements; in both cases the lack of any shared model of student progression is a primary cause. We have already referred to the need to sequence theory and practice; there is also a need to gradually increase students' skill repertoires and clinical understanding and further develop the quality of their practice. This depends on having a model of progression and on formative assessment of students' progress, or it is difficult to match students' work allocation to their learning needs. We shall discuss the placement system in Chapter 4; here we simply note that it was disconcerting to find little differentiation in hospital settings between students at different stages in their programmes, so that some could have their learning opportunities unreasonably constrained while others were stretched beyond their competence. Decisions about what responsibilities to give students were often determined more by circumstance than by judgement.

The quality of mentoring depends first on proper preparation for the mentor role. We observed considerable variation; some mentors had a clear sense of what they were trying to achieve; others, although apparently 'good' practitioners, were reported as teaching 'absolutely nothing' to their students. Poor role modelling was also reported in client assessment, interpersonal skills, care planning and mental health practice. Settings where deliberate attempts were made to create learning opportunities were unusual; observers repeatedly noted even naturally occurring opportunities for teaching being ignored. Referring to scientific knowledge was not seen as part of a mentor's role, even when it was of critical importance for the quality of care.

Observational studies of student nurses in adult hospital settings revealed cases where lack of biological knowledge in particular affected the quality of care. In some cases this applied to qualified staff as well as students. Hence the use of scientific knowledge is a service problem as well as an education problem, an issue further discussed in Chapter 4.

Mentorship may improve over time, but current arrangements clearly do not provide quality assurance. There are good mentors but how many students work with them? The alternative or, preferably, complementary strategy for supporting learning in clinical settings is the use of link lecturers, where the problem appears to be not quality but quantity. Our observations found that in many contexts appearances by link lecturers were welcome but rare; other duties took priority.

Mediation during discussions and workshops

Our observations suggest that the greatest amount of mediation occurred in discussions and workshops where mediation of scientific knowledge was an important, explicit goal. However, only in Case Study 1 did there appear to be enough of this type of teaching to cover the range of scientific knowledge the programme purported to teach. Moreover, a significant portion of the available time sometimes had to be used to explain scientific content which had previously been taught but not understood.

Another difficulty noted was that mediation often stopped short of discussing implications for nursing care. Discussions enhanced students' understanding of a medical condition, but did not progress to discussing the appropriate nursing care; the final link with nursing practice was missing. It may have been assumed that this link would be made in service settings, but as we have seen that was not a safe assumption.

Conclusion

The case studies and mini studies reported above enabled us to observe how discipline-based theory was taught in a number of contexts and how that theory was mediated to promote and facilitate its use in practice. A wide range of teaching methods and approaches were observed in education settings, some achieving their purpose more successfully than others. However, even good teaching over a sequence of sessions, cannot ensure appropriate use of theory in practice if crucial links in the mediation chain are missing. The main reasons for the contributions of the biological, behavioural and social sciences not being realised in practice were:

- little mediation of theory in service settings
- lack of clarity about whether learning objectives were being facilitated in education settings, in service settings or both
- insufficient provision for mediation in the curriculum plan; important links might be omitted, too little time might be allocated, the group size and setting for teaching might be inappropriate for this purpose
- inappropriate teaching, which did not achieve the envisaged range of purposes: this could indicate a staff allocation or a staff development problem.

Problems are greatest in the biological sciences, where both understanding the context and appreciating its relevance can cause considerable difficulty. It is unfortunate that low priority content is often included at the expense of a more thorough treatment of high priority content. This stems, we believe, from a failure to sufficiently articulate the curriculum demands of teaching for theory use in addition to comprehension. Another difficulty is that, in general, students come into contact with few staff who are skilled in mediating biological knowledge into practice.

We hope our work on knowledge use by experienced practitioners will give a clearer indication of the kind of learning goals needed; hitherto one of the problems facing programme designers has been a shared lack of clarity about precisely what was involved in using scientific knowledge in practice. This third part of our report has revealed that most programmes have some way to go to incorporate sufficient mediation to make the desired impact on the development of students' practice. We also need to recognise that helping students to become the kinds of practitioners we need requires more time than is available on a three year pre-registration programme. Our research suggests that less ambitious goals more directly pursued might be a wiser programme of action, but that would involve giving more attention to continuing professional development after registration. These and other policy issues are discussed in Chapter 4.

4.1 The use of focus groups

The Project brief included the obligation to discuss policy implications of any research findings. The research team did not believe policy matters were best considered by a small team in isolation, so after some reflection and advice from our steering group we decided to hold three focus group days and to take advantage of a session at the annual ENB Research Conference.

In recruiting focus groups we tried to cover several regions, the three areas of practice studied, and service and education interests; one group was specifically devoted to midwifery. The focus groups helped in the following ways:

- deciding how best to present our findings
- clarifying the wider policy context
- providing a critical forum for discussing some of our early ideas about policy implications
- raising important issues to which we had given insufficient attention
- reassuring us about the typicality of our data.

We did not attempt to systematically survey focus group opinion for presentation, so responsibility for this part of the report remains with the research team.

4.2 The wider policy arena

Our brief focused on the implications of this research for curriculum assessment and teaching arrangements and for the professional development of all concerned with delivering pre-registration education programmes. However, discussions about such matters necessarily involve assumptions about the wider policy framework. Policy-making affecting professional education is neither static nor immune to external influence, so we felt it appropriate to discuss wider policy issues relevant to our research. These are:

- implications of the purchaser/provider approach to pre-registration education
- the relationship between pre-registration and post-registration programmes
- the changing nature of the midwife's and nurse's roles
- changes in higher education curricula
- the challenge of competence-based qualifications.

Purchaser-provider approach

Current interpretation of the purchaser-provider concept seems to regard the NHS as the purchaser and educational institutions as providers, but a major part of pre-registration programmes takes part in service settings and its quality is mostly determined by service-employed professionals. This suggests that in respect of placements, educational institutions are the purchasers and NHS trusts the providers. The educational institutions, however, depend on trusts' good will and have little bargaining power. Some placements may be found in the private sector, but it would be neither feasible nor appropriate to rely on the private sector for the bulk of placements. What many regard as the most critical part of the programmes – the placements – is the least accountable.

Relationship between pre-registration and post-registration education

This relationship is also more complex than commonly recognised. Employers and occupational cultures regard registered staff as competent almost by definition, but as the knowledge base grows, increasing pressure is put on the pre-registration curriculum: indeed that was one of the main arguments for introducing the DipHE in nursing. Post-registration education is limited to advanced qualifications for the few and short top-up programmes for the many, conflicting with the principle of lifelong learning. Most professions regard continuing professional education as part of one's duty to one's clients; registration may entail a radical change in financial status and even in social role, but should never be regarded as a summit of professional learning. It is more appropriate to consider a series of transitions, continuing across the point of registration, in which greater responsibility is gradually assumed and the range of duties is widened.

It is less frequently appreciated that pre-registration education depends on post-registration education, as well as vice versa. Chapter 3.7 reported how qualified staff in service settings exercised a major influence on the quality of pre-registration programmes. If aspects of their normal practice are ill-defined, lack quality or make insufficient use of scientific knowledge, the next generation of students will suffer. If qualified staff provide good role models, appropriate coaching and a supportive learning environment, students are likely to provide quality mentoring for the generation after them. This suggests that **the best starting point for a virtuous cycle lies in post-registration education**. Improving the quality of qualified staff should be of equal benefit to service, whose clients will benefit, and education, whose students will benefit.

Since the work on knowledge maps was based on interviews with advanced practitioners, it captured the effect of post-registration as well as pre-registration learning. This leaves open for debate, and possibly further research, decisions about what should be expected of the use of scientific knowledge at the point of registration. This question is discussed in the next chapter, but we note that **knowledge maps also provide guidance for post-registration learning**: following our argument about starting virtuous cycles at the post-registration stage, that could be their most important contribution to pre-registration education. Maps could be used for designing **accredited modules** or introduced through **clinical audit followed by appropriate team-based learning**. In both cases they provide a useful bridge between reviewing the assessment of and care offered to clients and further developing expertise in relevant areas of scientific knowledge. This kind of post-registration learning in service settings would have a huge positive impact on students learning to value and use scientific knowledge.

The changing role of midwives and nurses

The movement towards increasing the priority accorded to community-based midwifery received strong government endorsement with the publication of *Changing Childbirth* (1993). The increasing proportion of community-based work will raise expectations of midwives' competence and, together with the need to assimilate new research, this will increase rather than decrease their need to use scientific knowledge.

The future role of nursing is less clear; although it seems likely that there will be a greater emphasis on community-based work, the shortage of suitable community placements has proved a major problem for DipHE nursing and midwifery programmes. Our view is that nurses in both community and institutional settings will continue to acquire new responsibilities, while increasing use will be made of health care assistants. The demand for the use of scientific knowledge will increase, and the question of how best to teach it is likely to become increasingly important.

The situation in nursing has been more confused than for other professions, because the move into higher education coincided with the amalgamation of schools of nursing and a series of cutbacks in teaching staff. This has made it difficult to distinguish whether curriculum planning has been most constrained by higher education committees, the Board framework for DipHE, local interpretations of higher education and Board requirements, or lack of clarity and realism in curriculum development. Midwifery has moved into schools or faculties of health studies, losing organisational – but not necessarily curricular – autonomy. The incorporation of programmes in midwifery and nursing fits the more relevant, vocational image many universities are cultivating, but their experience of handling practical knowledge within academic frameworks is limited. The next chapter discusses how progress in curriculum design depends on practitioners articulating their practical knowledge more clearly; only then can issues like the use of scientific knowledge be given the attention they deserve.

Competency-based qualifications

Competency-based qualifications are being given increasing attention by higher education, and it is difficult to predict their future. Not all follow the National Council for Voluntary Qualifications (NCVQ) model, while this is neither static nor entirely settled at the higher levels. The main criticisms of NVQ – its assessment and the fragmentation caused by too many separate statements – are particularly problematic at higher levels, where modified approaches are needed. Higher education, however, is most concerned by the subordinate role given to what the NCVQ persist in calling 'knowledge and understanding'. This is where our project is most relevant; the processes and activities labelled by the column headings in our knowledge maps could be described in terms of competencies. The maps would then solve NCVQ's 'knowledge problem' by showing how underpinning knowledge can be built into descriptions of competency. The current approach, which simply lists knowledge separately from competencies, is highly unsatisfactory.

4.3 Curriculum implications

The curriculum implications of this research are considerable. The effectiveness of teaching depends on realistic goals and slots in the overall curriculum framework which maximise linkage with other parts of the programme. The principal issues demanding attention appear to be:

1. The need for a holistic, developmental perspective on student learning when structuring and sequencing curriculum content and CFP placements.
2. The need for clear, realistic goals for the whole programme which specify the level of competence expected at registration and expectations for the use of scientific knowledge in assessing clients and delivering appropriate care.
3. Realistic and reliable arrangements for providing learning support on placements.
4. An overall plan for coordinating different parts of the programme, moving between the development of specialist scientific knowledge and the holistic delivery of care, and linking book-based and experience-based knowledge.

The evidence reported in Chapter 3 confirmed that learning is enhanced when sequencing of material is planned so that prior knowledge and experience are in place when needed, important linkages are made within a short time, mediation between education and service settings is frequent, and the quantity of material covered is limited to what students can be realistically expected to learn. Logical arguments may determine the order in which content is taught, but psychological arguments draw attention to the timing. Relevance has two meanings for students: relevance for practice and relevance to other parts of the programme. Chapter 3.7 notes the overwhelming importance of relevance to practice resulting from the process of professional socialisation; relevance to other parts of the programme must be a priority for professions that stress their commitment to a holistic approach. More specific conclusions from our research were as follows:

- students need enough basic biological knowledge not to be perceived as totally ignorant on early placements
- biological knowledge will be easier to teach in a manner perceived as relevant if there is already some placement experience to link it with
- carefully selected practicals can enhance understanding of critical aspects of biology, but still need linking to other aspects of students' experience
- some students may need flexible access to additional learning materials and support where there are significant gaps in their scientific knowledge on entry, but they must be convinced that it is needed for more than examination purposes
- students need to develop a repertoire of simple practical skills as early as possible so that they can enter placements with credibility and feel able to participate
- the teaching of related content in different parts of the programme needs to be coordinated and linked to practical experience
- a clear map of the programme is needed which enables students to understand how the components link, and how they are expected to progress towards qualification.

Most of these conclusions are supported by other recent evaluation projects, notably Chapple et al (1993), Jowett et al (1994) and Maggs et al (1994); no contradictory evidence has come to our attention. We are inclined to agree with Pearson's and Clarke's (1994) attribution of part of this problem to the prolonged 'health focus' of the CFP, but note that similar problems occur in midwifery education, where a health focus is normal. Traditional approaches to discipline-based teaching must also be held responsible.

In considering these conclusions it is important not to underestimate the strength of students' psychological need to gain acceptance in clinical settings, and its effect on their selective attention to scientific knowledge. Until that preoccupation has been at least partially satiated it will be difficult to draw their attention to other agendas. It is useful to cross-refer to Fuller's (1970) concerns-based model of development, based on the sequence of students' concerns as they progress through a pre-registration programme for school teachers. Her model is summarised in Figure 16.

I. Early phase	0	Concerns about self (non-teaching concerns)
II. Middle phase (competence)	1	Concerns about professional expectations and acceptance
	2	Concerns about one's own adequacy: subject matter and class control
	3	Concerns about relationships with pupils
III. Late phase (professionalism)	4	Concerns about pupils learning what is taught
	5	Concerns about pupils learning what they need
	6	Concerns about one's own (teacher's) contributions to pupil change

Figure 16: Concerns model of teacher development (adapted from Fuller, 1970)

Fuller found that initial concerns about oneself (Stage 0) were rapidly superseded by concerns about practical competence (Stages 1-3) which remained powerful for a considerable period. For nursing and midwifery programmes these can be translated as:

(i) acceptance by qualified staff in clinical settings

(ii) being able to carry out the expected range of tasks in service settings

(iii) good relationships with clients.

As students' competence and confidence develops, they begin to find space for other, more professional concerns (Stages 4-6), which entail going beyond basic coping with routine demands to the beginning of client-centred practice based on reflection, personal theorising and the practical use of scientific knowledge. Fuller's central conclusion was that teaching directed towards later concerns is likely to have minimal impact until earlier concerns have been at least partially met. Thus, client-centred practice is viewed as a progression beyond basic routines, not as an alternative to them.

The Fuller model suggests that an ideology-first approach to curriculum sequencing may not have the desired effect – it may fail to build on students' own values, and runs a risk of being perceived as idealistic and inauthentic. When students become more able to give serious attention to client needs and have experienced and talked through incidents of concern, they will be better prepared for discussing more fundamental value issues. This suggests using the first part of pre-registration programmes to develop minimum standards of practical competence, familiarity with clinical settings and some general holistic understanding of clients' experiences and needs. This can be used as a platform from which to address client assessment and the delivery of care at a more advanced level, requiring higher levels of thinking and the use of more scientific knowledge. More specialised treatment of scientific knowledge could start at the beginning of the second year, by which time a holistic approach to care has been established and students have sufficient experience to understand how that knowledge links to practice and, more specifically, to clients' needs. Our research suggests that **front loading scientific knowledge** into the first year of the programme **is a wasteful strategy** which causes unnecessary repetition. Linkage would also be easier if students had embarked upon their branch programme, so that cross-references to practice could be more focused.

Formulating realistic goals

Entries on the knowledge maps depict the knowledge of advanced rather than novice practitioners, but the mode of representation can be the same for all groups. To make decisions about goals for the use of scientific knowledge at the point of registration, two investigations are needed, one bottom-up and the other top-down. The top-down process involves selecting a suitable subset of the advanced practitioner entries after careful study of service demands and staffing patterns. **Frequency, criticality and availability of back-up** would be important criteria in **determining priorities for newly qualified nurses and midwives**; then consultation and judgement would be needed to strike a balance between the priorities of different service settings. The bottom-up process would be concerned with finding out **what goals or sets of goals are realistically achievable on pre-registration programmes**. We recommend this take place after some of this reports' recommendations on enhancing students' capability for using scientific knowledge are implemented, and that goals for advanced practitioners be established through further research (see Chapter 5). **Goals excluded from pre-registration programmes should be given priority in post-registration programmes**.

Discussion of the knowledge maps also provides an opportunity to attend to the processes used as column headings. Conducting these processes often requires skills and techniques as well as use of scientific knowledge, and that dimension of quality performance should not be underestimated. Use of scientific knowledge is necessary for good practice but not sufficient.

Learning support on placements

Learning support on placements is vital, and its quality must not only be stated but assured. **Expectations must be realistic about how much support can be guaranteed**, and how much can be learned on placement when receiving that level of support. Many expectations of placements seem unrealistic, and some may only be achieved if support is also provided from education settings (Turner Shaw, 1994). We still recommend, however, that **minimum requirements** for support be **clearly established and upheld**. These would need to cover a **guaranteed level of mentor support**, the provision of an **environment conducive to learning** and **a balance** when allocating tasks and duties **between service needs and students' learning needs** (White et al, 1993). Consideration might be given to introducing a **quality learning award for units** meeting agreed standards of learning support for students and qualified staff.

Overall plan for the programme

How can overall programme plans be used to weave together different parts of the programme? How can sufficient time be allocated to work through the most vital areas of linkage between theory and practice? How can students be expected to combine theoretical knowledge and practical experience into their practice and into their continuing development of that practice? Just introducing more mediation into existing curricular patterns on the lines suggested in Chapter 3.7 will not provide a sufficient response to these critical and widely recognised problems. A deeper and more thorough conceptual framework is needed to enable more radical curriculum designs to be conceived, developed and evaluated. Our observations suggested that even when welcomed by students, mediations did not always have a clear purpose, and when the purpose of individual sessions was clear, the collective purpose of a sequence of sessions was less clear. **Most mediation chains appeared to have missing links**. Hence we decided to develop a model of the mediation process to incorporate all the kinds of mediation observed and suggest other possibilities; its prime purpose was to provide a curriculum overview of mediation and theory-practice relationships (Figure 17).

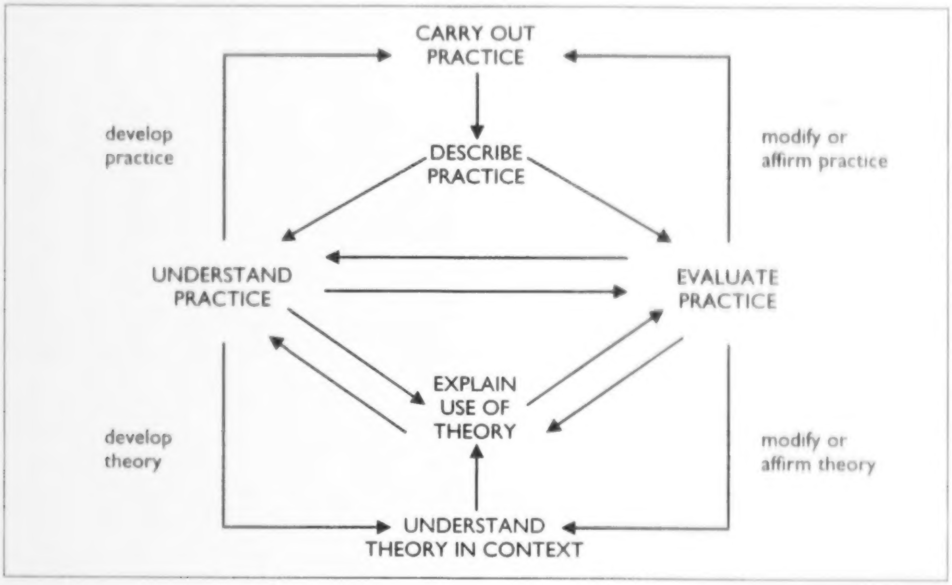

Figure 17: A model of processes linking theory and practice

'Theory' in Figure 17 includes public theories of nursing and midwifery practice as well as those discipline-based theories and concepts described under the generic heading of scientific knowledge. The boundary between **personal** and **public theories** is difficult to delineate, but personal theories normally arise in the context of trying to **understand practice** by theorising about one's observations and experience, so we regard them as primarily located in that part of the model. When somebody wishes to give public status to their personal theories they are obliged to explain and justify them and set them in the context of published theories – the process depicted by the arrow labelled **develop theory**. Similarly, moves to understand practice through theorising may lead to attempts to develop new practice.

The main assumption underpinning the model is that the learner's primary aim is to carry out 'best' practice, where best implies optimal benefit to clients within the constraints of the service. It is also assumed that, if there is no deterioration in the context, personal practice can continue to improve after registration. Such improvements result from reflection on personal practice and from incorporating new methods, ideas and understandings into that practice. The processes of understanding and evaluating practice and discussing the use of theory are distinguished primarily by their starting point (theory or practice) and purpose (understanding what is happening or assessing and valuing its effect). More controversial perhaps is our inclusion of **describe practice** as a separate element. There is much debate about the extent to which description is necessary for personal understanding or evaluation of practice, but it is difficult to argue that description can be avoided when these processes are pursued collectively. Students in particular need to describe practice in discussions with mentors and in education settings, so describing practice is an important link in the mediation chain without which people resort to exchanging opinions with limited mutual understanding.

Our model goes beyond the diagram in Figure 17 to list the processes which may be involved under each of the six main headings. These will be discussed two at a time, starting at the practice end with Panel F.

Panel F: Processes involved in carrying out and describing practice

Carry out practice

- Interacting with clients; assessing, consulting, informing, responding, monitoring.
- Performing the tasks required with appropriate adjustment to client and circumstance.
- Responding to contingencies: dealing with the unexpected or things that go wrong.
- Overall management of the process: setting priorities, allocating time, deciding when to do what, consulting others if necessary.
- Handling the environment, both physical – with its health and safety implications – and interpersonal, made up of colleagues, clients relations and friends etc.

Describe practice

- Describing what is involved in each of the above
- Describing what various people think should happen
- Describing what does happen in a range of contexts
- Making the tacit explicit
- Making practice available for criticism

People may wish to formulate their own versions of 'carry out practice'; our's is adapted from Mansfield and Mathews' (1985) Job Competence Model, widely used in the development of occupational standards. The scope of 'describe practice' has also been defined in broad terms to include variations with context and person and possible idealised or fictional alternatives. Provided that clear distinctions are made between fiction and reality, this allows students to speculate on what practice might be like, an important stimulus to thinking about practice, responding to it emotionally and objectively and expressing personal values in the process. It is also intended to get people to think through ideas for improving practice in detailed practical terms. Description also has an important role in helping make the tacit more explicit and thus available for critical appraisal.

Panel G: Processes involved in understanding theory in context and explaining its use

Understand theory in the professional context

- Ensuring awareness and comprehension
- Establishing its relevance
- Linking it to other theory
- Linking it to particular aspects of practice

Explain use of theory

- Recognising its relevance to a range of situations
- Interpreting its meaning and significance in particular contexts
- Using theory in analysing particular cases and situations
- Using theory in decision-making
- Using theory in evaluating practice

Panel G gives a more detailed breakdown of the theory end of the model. There is some possible overlap between the two main headings where linkage is concerned; 'understanding theory in the professional context' necessarily involves establishing its relevance and linking it to particular aspects of practice, but this level of linkage is more at the level of knowing where it is used, while describing the use of theory also involves knowing how it is used. The former may be achieved by lower levels of mediation, earlier described as 'putting out markers'; the latter requires thorough discussion and relevant experience of practice to be fully effective.

Some overlap becomes apparent between 'explain use of theory' and the two remaining headings 'understand practice' and 'evaluate practice'; 'understand practice' needs rather more justification than the other two. The underlying argument is that understanding is the natural goal of reflection and a prerequisite for any sensible attempt to change one's practice. While evaluation will sometimes suggest what changes might be desirable, understanding is required in order to bring them about. As suggested in Panel H, understanding means knowing why practice is like it is.

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Panel H: Processes involved in understanding and evaluating practice

Understand practice

- Institutional factors
- Midwives traditions
- Nursing traditions
- Developing situational understanding
- Explaining why things get done in a particular way
- Establishing the knowledge base underpinning practice
- Developing personal theories of practice

Evaluate practice

- Assessing effect on clients
- Impact on other stakeholders
- Possible consequences and outcomes
- Recognizing value issues
- Awareness of alternatives
- Awareness of constraints
- Midwife's role/Nurse's role
- Developing quality awareness and discernment
- Using research evidence

Practice does not emerge fully developed out of a research laboratory; it is already largely determined by the nature of health and illness, health care organisation and the ways in which health professionals are accustomed to working. Practice relies not only on the knowledge and competence of individuals but also on organisations that work. It may be difficult to differentiate practice that genuinely represents the best available, feasible alternative and that based on well-established routines and coping mechanisms that have ceased to be optimal for clients. Reflective practitioners need to develop a critical understanding of service settings, their historical evolution and current culture to appreciate the problems and possibilities of change and the tensions that can arise when changes in practice are proposed. They also need to understand the extent to which observed or alternative forms of practice are supported by research and scientific knowledge.

Many would argue that this kind of understanding is an important prerequisite for evaluation, or at least for any sensible decision-making that might follow evaluation. The general concept of ongoing improvement of practice depends on good evaluation, which in turn depends on understanding both current practice and possible alternatives, including the use of relevant scientific knowledge. Evaluation without explicit reference to both values and theory is dangerous, because it means hidden or implicit values and theories are being used which have not been properly identified and subjected to critical analysis.

The purpose of the model is to provide a **conceptual framework for analysing curriculum designs**. One can ask about the contributions of the various curriculum slots to the processes listed in Panels F, G and H and even the likelihood of these goals being achieved within that particular framework. Or one can ask where the various processes described in the model are meant to occur, what priority they are given, and hence whether the design incorporates sufficient and appropriately located mediation. **The contribution of scientific knowledge to**

the quality of practice demonstrated by newly registered practitioners will depend on what knowledge is incorporated into the curriculum and on the extent to which students learn to use it in a reflective, critical and professional manner.

4.4 Implications for teaching, learning support and assessment

The brief for a teaching session or series of sessions is set by the curriculum framework in which it is situated. That framework, however, comprises more than a set of documents, it includes the norms and traditions to which lecturers are accustomed; where there are incompatibilities, there are no guarantees that the 'official' version will take priority (Eraut, 1990). Curriculum change is a complex process in which the professional development of lecturers plays an important part. Doyle and Ponder (1977) discuss a 'practicality ethic', whereby judgements about innovations are grounded in considerations of practicality rather than merit. The paradox is that sometimes assertions of impracticality may be a routine defence mechanism, while on other occasions they draw attention to problems that cannot be ignored. Hence we argued in Chapter 4.3 that 'top-down' formulation of goals for pre-registration programmes, based on practitioners' new roles and knowledge maps depicting the scientific knowledge required to support them, must be balanced by 'bottom-up' judgements based on evidence about what goals are achievable under given conditions. These factors played an important part in enabling the higher levels of linkage observed in Case Study 1, while in other studies we observed many curriculum slots where linkage strategies were severely limited by the size and heterogeneity of the group.

We are acutely aware that if our recommendations for giving higher priority to linkage and adopting the more comprehensive and systematic approach outlined in Figure 17 and Panels F, G and H were followed, lecturers would be moving into uncharted territory. Much teaching development is required, and there would be considerable uncertainty about what outcomes to expect. Therefore our suggestions in this section will be more speculative than our recommendations in the previous section; nevertheless we feel they are congruent with the recommendations of Jowett et al (1994), Phillips et al (1994) and Miller et al (1994).

Involving students

Ultimately, students can only learn for themselves. They must make their own links, develop their own personal repertoire and knowledge base, and take responsibility for their clients' care. The first principle of teaching must surely be to share with them from the outset the problems discussed in this report. Students need ongoing support in understanding the nature of the professional knowledge they seek to acquire, taking control of their learning strategies and processes and making optimal use of learning resources available to them. We agree with Miller et al (1994) that **the process of learning to learn should be given early priority** but **not confined only to programmes' induction phases**. Moreover, the traditional study skills programme is too narrowly focused for a professional programme, in which **problems of learning from experience need equal priority**. Where possible, such discussion should be reflective rather than anticipatory and should **encourage differentiation between different kinds of learning and different kinds of knowledge**.

Another learning process omitted from study skills programmes relates to learning in groups. **Students are important learning resources** for each other, particularly in learning to describe and compare practices in different settings. As argued earlier, description is important for developing collective understanding of practice, yet the quantity and quality of student to lecturer description is limited by both lecturer availability and social conventions about the distribution of 'air time' in groups. Students have to learn to use each other as resources for understanding practice; learning to work like this in small groups will take guidance and time, if they are to move beyond the exchange of anecdotes and opinions to the critical analysis of experience. Such groupwork would also be enhanced by some **intervisiting of students** towards the end of their placements.

Linkage and learning

There are good arguments for a linkage and learning component throughout the first year, addressing all the issues related to students developing the skills and dispositions needed for developing knowledge and competence. This would involve some frontloading of teaching resources – a good investment if students become more able thereafter to learn independently and in groups. Discussion about what is being learned and how should continue thereafter but be integrated into regular sessions given to the use of theory and understanding and evaluating practice.

The first priority for designing teaching sessions must be getting the brief right. What are the specific goals and what is the intended contribution to students' knowledge? Two devices have been developed for guiding this kind of decision: the knowledge maps depicting when and how scientific knowledge is used, and the model for linking theory with practice presented in Figure 17. A model organising the range of practical processes built into theories of nursing and midwifery and the column headings of the knowledge maps would also be useful. While models and maps of this kind can never be blueprints, and a diversity of versions should be encouraged, they at least provide an analytic framework for addressing important issues in teaching that are given little critical attention.

Theory-oriented sessions should be designed with the kinds of goal depicted in Panel G in mind. Our research strongly indicated, along with other studies (Jowett et al, 1994; Maggs et al, 1994) that these sessions **need to give much greater attention to linkage** than has been customary, even though they are designed to start at the theory end. Appropriate knowledge maps should prove useful in guiding thinking and suggesting priorities; they should be shared with students from the outset so that they can appreciate the linkages and see what they will eventually need to know. It is also possible to envisage learning support material being linked to the maps so that students can study some of the knowledge use 'boxes' and their underpinning scientific knowledge more independently. **The design of the maps is ideally suited for information retrieval systems**, and we recommend that this approach to designing and organising support material be investigated urgently. The need for a search could be triggered by events in any part of the programme and the possibility of locating a retrieval system in service settings could also be explored.

Recognising the relevance of scientific knowledge

Our research indicated, however that sometimes the missing link was the recognition in service settings that a particular area of scientific knowledge was relevant. One remedy is through the mentoring process, where gaps in student awareness may be discovered and addressed, either by regular questioning about client assessment and the practitioner's response, or by instituting a 'topic of the week' arrangement to focus attention on the practical use of a particular area of scientific knowledge (aided by reference to the appropriate knowledge map). In some settings students could bring relevant new material back to the unit or team, thus including post-registration education within the same set of discussions. Another method of developing recognition is through **case discussions in education settings**. These would need to focus on a fairly random selection of cases or recognition would be pre-empted by the title of the session.

The distinction between knowledge being of possible relevance and being essential for deciding the priority for action would need to be carefully discussed, together with judging the relative weight to be given to short-and medium-to-long-term client needs in different situations.

More **structured discussion of knowledge use in practice** to meet the goals listed in Panel H will be concerned with going beyond relevance to decide what practice is best when the full corpus of relevant knowledge is considered. This will be more effectively achieved when cases are grouped in a planned way to meet the objectives of each session. The difference between these situations and those aimed at describing theory in use will be the emphasis on a holistic approach to a case, rather than the use of a particular piece of scientific knowledge across a range of cases. This kind of linkage addresses the central issue of how to provide optimal care for clients and how to be critically reflective and evaluative about the way one performs that core professional duty. The general conclusion of our research into the mediation of scientific knowledge was that more sessions of this kind are needed; otherwise too much responsibility is allocated to the placement part of the programme. Unrealistic expectations of placements amount to no more than wishful thinking. Interviews and scenario-based discussions showed that **students were unused to activities which systematically studied the knowledge-base relevant to a particular case**, but found the experience valuable in reassuring them about what they did know, encouraging them to link it more effectively and revealing gaps in their knowledge. With appropriate early training in groupwork, students can do much of this work themselves.

The implications for assessment are important but do not need spelling out in great detail. **Formative assessment** becomes important when control of learning is explicitly made over to students, because it **provides a critical source of feedback**. However, it needs to be integrated into the teaching and learning process, so it does not direct valuable time and effort away from learning. **Summative assessment should not only reflect the goals of the programme but preserve the balance of students' learning across those goals**. This always needs checking out in practice because unintended side-effects of assessment are notoriously common; these issues are fully covered in Phillips et al (1994). Assessment will always be a sampling exercise; the sample can be quite large when practice is judged by ongoing observation of performance, though post-observation interviews to assess understanding and ask 'what if' questions are also important. Assessing a knowledge base by scenario questions usually involves fairly light sampling, which is satisfactory when the questions are not too predictable. What needs to be avoided is trying to cover all possible goals without sampling – that leads to an unreasonably large assessment load. Assessment policies have to be built on wise practical judgement which balances reliability and validity against cost and effort.

4.5 Implications for teachers, mentors and supervisors

The most important recommendation of the project is probably that staff involved in teaching and mentoring should have the knowledge, skills, confidence and disposition to undertake the role. This does not require that they be all-knowing – that may even discourage some students. Mentors should appreciate the limits to our knowledge of practice and be aware of the fallibility of professional judgement. The critical factors are **an adequate knowledge base, the right disposition towards and understanding of professional learning and continuous improvement of practice, preparedness for the role**, and **skill in supporting students and mobilising support from colleagues**. We would hope service units and teams would aspire towards achieving the quality learning awards suggested in Chapter 4.3, and that mentors and supervisors would have or be taking advanced qualifications. Education lecturers should **negotiate learning goals, support mentors** and discuss with them **students' priority needs**. Both parties should be familiar with knowledge maps at registration and advanced practitioner level, though not necessarily with all the detail needed beyond registration. The mentor would need to be especially knowledgeable about the application of the maps to assessing and caring for clients in their team or unit, the lecturer should have access to the latest research in relevant areas of practice.

Supervisors or team leaders have the particular problem of **allocating tasks and duties** in a way that gives reasonable priority to **students' learning needs** and those of qualified staff. Mentors and link lecturers have the responsibility of **keeping supervisors informed** of those needs. Supervisors and mentors together have **responsibility for the learning environment** and the culture of their unit or team. Someone in both the educational institution and the service organisation needs responsibility for acquiring and sharing knowledge about the various ways in which supervisors and mentors have been able to support student learning in service settings. **Good practice in this area needs to be more widely disseminated as a stimulus to the further development of support strategies for learning.**

All the implications for personnel discussed above are directly related to performing their roles with distinction; few would argue with that. The project has contributed a view of what those roles should be, i.e. a set of partial job descriptions. There are obvious implications for staff selection and development and for the allocation of duties. We have avoided making recommendations about how this should be done – we believe the approach should be flexible and imaginative in developing the capabilities of current staff. The only criterion which ultimately matters is how well they meet the needs of their students.

We wish to draw attention, however, to two important issues. First, the need for understanding **the relationship between quality of practice and being able to use relevant areas of scientific knowledge is not widely appreciated**. Linkage is particularly difficult when **people do not know what they do not know**; this must be taken into account when introducing change and planning staff development. Second, **people consistently underestimate what is involved in changing one's practice**. Changing practice involves significant unlearning or deskilling, because established routines and patterns of decision-making must be demonstrated and rebuilt in a new context. The effect is like that of going back to being a novice again but without the lower level of expectation that goes with that status; it is extremely stressful and requires psychological support as well as practical training. In terms of the Concerns Model (Figure 16), people's concerns regress during times of change back to doubting their basic competence, and it takes time and experience to return to the higher 'professional' levels. Staff development needs to be directed toward those concerns which are currently highest and follow the changes in those concerns over time.

5.1 The development and use of knowledge maps

The principal achievement of the project in this area has been conceptual and methodological. We have developed research strategies for investigating what scientific knowledge is used in practice, when and how. These are still fairly crude, but we believe they are unlikely to be significantly improved without spending more time with practitioner informants. The representation of this information is an important part of the process; our knowledge maps were an important part of the second 'respondent validation' interviews. The precise headings used for rows and columns in these maps may not command universal assent and may need some variations with context, but there are clear advantages for the design of pre-registration programmes in trying to have as few variations in map format as possible. As people get more experienced, they may also wish to adjust the coding system: other coding systems are clearly possible and much investigation remains to be done into which forms of coding are most appropriate for which purposes.

Use of the maps to elicit practitioners' use of scientific knowledge will undoubtedly reveal a great deal of variation which may be attributed to the current work context, educational history or personal talent and disposition. The project was not designed to address the issue of interpreting and discussing the policy implications of such variation. We are especially concerned that knowledge maps should be used to create definitions of expertise that are not based on practitioner judgement alone but also grounded in evidence and argument about benefits to the client. Practitioner judgement should never be used uncritically as a proxy for clients' interests. Thus we hope that use of the knowledge maps will stimulate empirical research to refute or justify the claims implicit in every map entry.

Research into the further development of the knowledge maps themselves might involve the following kinds of project:

1. Exploring variations in map formats and coding systems.
2. Developing knowledge maps for other important topics.
3. Studying the variations in knowledge use among practitioners.
4. Research into practice seeking to establish map entries based on evidence of client benefit as well as practitioner judgement.

An important by-project of this fourth type of research should be some indication of priorities for pre- and post-registration education. Who needs to know what at each level of responsibility in order to ensure that clients get the best care? If the Board wishes to introduce guidelines for the depth and breadth of knowledge of the biological, behavioural and social sciences to be taught on pre-registration programmes in nursing and midwifery education, they should be based on knowledge maps rather than simple specifications of content which ignore the problem of knowledge use. We have suggested in Chapter 4 how guidelines might be developed from knowledge maps by combining an approach based on client need with research into realistically achievable goals for pre-registration programmes.

This same approach would reveal which goals excluded from these guidelines needed to be built into post-registration programmes. A parallel approach to post-registration learning needs should be made through clinical audit, where the use of appropriate knowledge maps could also make an important contribution. The goal of continuous quality improvement in health care depends to a significant extent on the knowledge base of all professionals concerned. Knowledge maps can provide a central link between clinical audit, continuing professional development and quality improvement in education and service settings. This in turn will help to provide the kind of learning culture in which pre-registration students need to be trained.

Although some of the further research we advocate will be better tackled by funded projects or research degrees, there is also considerable scope for small-scale research on the development and use of knowledge maps which would suit local funding or project work within degree programmes or advanced qualifications. For example, investigating a cluster of boxes on a knowledge map would be a challenging, feasible and useful project. Work of this kind would help to establish constructive partnerships between advanced practitioners in education and service settings for the improvement of practice in both contexts.

Two further suggested uses of knowledge maps also merit further attention. One is their use to ensure the necessary contribution of scientific knowledge to any future competency-based system of qualifications. The other is the use of the maps as information retrieval devices which could link both students and qualified practitioners to sources of information, perhaps even to learning resources specifically designed for the purpose.

- Knowledge maps should be used to elicit, critique, develop and disseminate practitioner judgements which are grounded in evidence of benefit to clients.
- If the Board wishes to introduce guidelines for the depth and breadth of scientific knowledge to be taught on pre-registration programmes, they should be based on knowledge maps rather than simple specifications of content.

5.2 Improving learning in service settings

Our research has shown, in conjunction with other recent studies (Maggs et al, 1994; White et al, 1993), that the assumptions made in pre-registration programmes about learning and learning support in service settings tend to be over optimistic. This raises the important question of what kinds and levels of support are feasible and what conditions are necessary for their assured delivery. Studies of learning support in service settings are needed to investigate the effect of more organised schemes of support on student learning, the continuing professional development of qualified staff involved and local learning cultures.

We have limited evidence about what might be realistic standards of learning support in different kinds of settings, and how they might best be achieved. We discussed possible components of such standards in Chapter 4; and recommended consideration of a positive incentive such as a quality learning award for units providing a high standard of learning support.

The Board should consider sponsoring such awards, but first it might be advisable to sponsor some research to develop good models. There is an urgent need to develop, evaluate and disseminate practices which make good use of the potential of placements for developing students' practical knowledge and competence. It is difficult to see how other possible improvements to pre-registration programmes could have their intended effect if the nature, level and direction of placement-based learning remain largely unknown. Standards of learning support need to be established by research rather than wishful thinking, or those service managers with a low interest in education will be able to continue to provide discouraging learning environments for students.

- Studies of learning support in service settings are needed to investigate the effect of more organised support on student learning, the continuing professional development of qualified staff involved and local learning cultures.

- A positive incentive for service settings to provide a high standard of learning support should be introduced, such as a quality learning award.

5.3 The need for a developmental perspective on student learning

Our analysis of the case studies in Chapter 3.7 suggested the psychological imperative for students to become accepted in service settings cannot be ignored. Hence students need to develop a repertoire of simple practical skills as early as possible so they can enter placements with credibility and feel able to participate. Students also need enough basic biological knowledge not to be perceived as totally ignorant on early placements. After that, further biological knowledge will be easier to teach in a manner perceived as relevant if there is already some placement experience to link with. Front loading of scientific knowledge is exceedingly wasteful – without linkage to practice it is quickly forgotten and has to be repeated. From the very beginning the teaching of related content in different parts of the programme needs to be coordinated and linked to practical experience. Similarly, the allocation of tasks and duties to students in service settings must be appropriate to their current level of competence in order to sustain progression and maximise learning.

The other important need for students is a first year **linkage and learning** component, which is more ambitious than an introduction to study skills and/or learning styles. The process of learning to learn should be explicitly on the agenda from the beginning of the programme. It should cover both learning from books and learning from experience and the problematic relationship between them, and be closely integrated with student learning in other concurrent programme components. The problem of trying to link scientific knowledge with observed practice should be shared with students; and the critical use of aids to linkage and learning such as pattern notes, knowledge maps and short reflective log-books discussed at an early stage. They also need to learn in groups and to use each other as learning resources, using lecturers for learning support after rather than before discussing problems and issues among themselves.

- Students need to develop a repertoire of simple practical skills as early as possible so they can enter placements with credibility and feel able to participate.
- Students need enough basic biological knowledge not to be perceived as ignorant on early placements.
- The teaching of related content in different parts of the programme needs to be coordinated and linked to practical experience.
- The allocation of tasks and duties to students in service settings must be appropriate to their current level of competence.
- Explicit training in learning from experience, learning from peers and learning to use scientific knowledge should be included in pre-registration programmes.

5.4 Building knowledge use into an overall curriculum plan

A large number of practical mediation strategies have been developed in education settings on a piecemeal basis by individual lecturers, but our research suggests that there is too little mediation and that individual sessions are attempting to achieve more than is feasible. In Chapter 4.3 we suggested that mediation needs to be considered at a whole curriculum level rather than left to individual lecturers to attempt in inadequate curriculum slots. Hence we recommend that every curriculum should have an overall plan for coordinating the different parts of the programme, moving between the development of specialist scientific knowledge and the holistic delivery of care, and linking together various forms of book-based and experience-based knowledge.

We also found that, as in most other professions, few conceptual frameworks were available for constructing an overall programme plan, especially for incorporating into it processes concerned with linking teaching in education settings with using scientific knowledge in practice. Hence we felt it necessary to attempt to fill this conceptual vacuum; Figure 17 (Chapter 4.3) presents an overview of the processes we believe should be involved, which are listed in detail in Panels F, G and H. This model can be used as a template for evaluating or creating curriculum designs which give greater priority both to the use of scientific knowledge in practice and the understanding and evaluation of practice than has been customary hitherto. It was encouraging to find that all six versions of the 'theory-practice gap' outlined in Chapter 1.2 can be accommodated by the model and discussed within it. We recommend it for further consideration by all those engaged in professional education.

We also recommend that research is undertaken to locate, evaluate and further develop innovative practices which use some of the various mediating processes listed in Panels F, G and H; and to assess how much can be achieved in a given time by given resources. Gradually, we have to find out how long it takes to achieve high priority learning goals pertaining to the use of scientific knowledge in assessing clients and delivering care. Until we do, designing pre-registration programmes will require a lot of guesswork. People may accept in principle some of the suggestions for improving programmes we made in Chapter 4, sections 4.3 and 4.4, but their practical implications cannot be worked out in detail until more developmental research has been done.

- Every curriculum should have a plan for coordinating different parts of the programme, moving between the development of specialist scientific knowledge and the holistic delivery of care, and linking book-based and experience-based knowledge.
- The model illustrating the processes concerned with linking teaching in education settings with using scientific knowledge in practice settings should be considered by all those engaged in professional education.
- Research should be undertaken to locate, evaluate and further develop innovative practices which use the various mediating processes, and to assess how much can be achieved in a given time by given resources.

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Appendix: Summary of Research Methods

1 Mapping the Use of Scientific Knowledge in Professional Practice

Two sets of interviews were conducted with experienced practitioners. The first interviews lasted from 1.5 to 2.5 hours. Their purpose was to elicit what scientific knowledge the practitioners were using in their normal practice. The main method used was the discussion of recent cases selected by the respondent, but opportunities were also taken to approach the problem through their work with students and/or newly qualified practitioners. The six knowledge topics chosen by the project were introduced at the beginning and provided a focus to the case discussions and no doubt influenced the choice of cases. However, only three or four topics were covered in any one interview.

Panel A1: Profiles of experienced midwife practitioners

1. Qualified in 1979 through the direct entry midwifery programme. Practised continuously as a midwife since that time. Experience in all areas but more in the delivery suite than the others. Special interest in alternative methods of relieving pain in labour. Mentor to both pre- and post-registration student midwives.
2. Qualified in 1984 (18 month training) and practised as a midwife since that time. Working in the community for the past two years and would like to remain there. Special interest in supporting women with social needs. Mentor to both pre- and post-registration students midwives.
3. Qualified in 1968 (12 month training, Parts 1 & 2) and practised as a midwife since then. More experience in community and postnatal care than any other. This was her choice since she feels that she can concentrate on health education and prevent problems occurring. Mentor to post-registration students.
4. Qualified in 1971 (12 month training). Also has Midwifery Teaching Diploma but chose to return to clinical practice. Experience gained in all areas of midwifery in this country and abroad. Mentor to post-registration students.
5. Qualified in 1988 (18 month training). Has practised as a midwife in all departments within the maternity unit but has had little experience in community settings. Presently undertaking the Diploma in Professional Studies (DPSM) with a view to progress on to teacher training. Mentor to post-registration students.
6. Qualified in 1986 (18 month training). Has experience in all areas with particular emphasis on parentcraft education and family planning. Has done further training in both. Presently undertaking the DPSM. Mentor to post-registration students.
7. Qualified in 1986 (18 month training). Working as a team midwife with own caseload of women. Committed to continuity of care. Does not want to specialise in any one area or aspect. Mentor to post-registration students.

Twenty-four experienced practitioners were interviewed, all of whom currently acted as mentors to midwifery or nursing students. Seven practitioners were midwives, six were mental health professionals and 11 worked in adult surgical areas. Details of the sample are given in Panels A1, A2 and A3. All were well qualified, but there was considerable variation in age, experience and current work context.

Panel A2: Profiles of experienced mental health practitioners

1. Experienced female working as a Community Psychiatric nurse who had both RGN and RMN qualifications in addition to her CPN qualification. She also had a teaching qualification as a nurse teacher. This enabled her to teach nursing assistants in the mental health setting although she wished to move into a role within a School of Nursing. She had been qualified for 20 years.
2. Experienced male RMN who had been qualified about seven years. Working as a charge nurse on an acute mental health admission ward in a district general hospital.
3. Male RMN qualified for about six years, working as a staff nurse in an acute admission ward of a small mental health hospital. Considerable experience of child psychiatry. Newly appointed mentor.
4. Male RMN also qualified as a Community Psychiatric nurse and with a first degree in Psychology. Qualified for about ten years and has completed a nurse teachers' course. Working as a Community nurse with the elderly mentally ill. Experienced mentor for both RGN and RMN students.
5. Female CPN of 22 years experience who was also qualified as an RGN. Experienced mentor to RGN, RMN and CPN students.
6. Experienced female working on an acute psychiatric ward. She qualified as RMN in 1988 and RGN in 1991. She had taken RNB 998 and is now a mentor to Project 2000 students.

The information from these interviews was used to construct knowledge maps, as described in Chapter 2. Earlier drafts of the maps, were then discussed with those 18 of the original 24 respondents who were available for the second interviews. They confirmed the general validity of the maps and made a number of additions. It was noticeable that as they began to understand the maps, they were able to think more broadly about knowledge use than in their first interviews. They suggested very few alterations to the entries already in place, confining their comments on these mainly to variations in the levels of knowledge use with the clinical context.

Panel A3: Profiles of experienced practitioners in adult surgical areas

1. Qualified in 1989. Worked as a staff nurse 2.5 years in general surgery, two years in mixed surgery and medicine, then two years in general surgery. Did Dr Chamberlain's cardiac course, ENB 998 (Teaching & Assessing) and various study days.
2. Qualified as an EN in 1986. Two years' experience in orthopaedics, one on medical ward mainly cardiology. Conversion course in 1989 then general surgery until the present. Did Dr Chamberlain's cardiac course, ENB 934 (AIDS), Nursing Process OU course and various study days.
3. Qualified first as an EN in 1985. Worked in chest medicine, female surgery and gynaecology. Undertook the conversion course to RGN in 1991. Worked in genito-urinary surgery since 1992. Has attended a variety of study days and is specialising in wound management.
4. Qualified in 1988. Worked in gynaecology and general day care surgery. Worked as 'E' then 'F' grade for 3.5 years in genito-urinary surgery. Has done ENB 998 (Teaching and Assessing) and now taking a BSc (Hon) degree in nursing.
5. Qualified in 1983. Has had a variety of posts all in surgery, mainly general some in the private sector and most in the NHS. Worked in emergency surgical ward since 1992. Has done ENB 100 (Intensive Care) and ENB 998 (Teaching and Assessing), plus a variety of study days.
6. Qualified in 1987. Worked as a staff nurse from 'D' to 'F' in an emergency surgical ward for the seven years since. Has done ENB courses 934 (HIV/AIDS) and 998 (Teaching and Assessing). Has also attended various study days.
7. Qualified in 1991 and has worked on an emergency surgical ward since then. Did Dr Chamberlain's cardiac course, one staff nurse development course and various study days.
8. Experienced female enrolled nurse who converted to RGN four years ago. Working in a general surgical area, primarily with elderly people. Mentor to general nursing students (RGN).
9. Experienced female Registered General nurse with a background in the Accident & Emergency Nursing, now working in gynaecological surgery. Deputy ward sister and experienced mentor for RGN students. Qualified for about seven years.
10. Experienced male RGN working as charge nurse, qualified 15 years and working on a mixed male and female urological ward. Experienced mentor to students.
11. Experienced female RGN, qualified for 14 years and now working as a Sister. She had a clinical background in surgery, now working with surgical patients in an intensive care setting. Experienced preceptor to both RGN and those pursuing intensive care qualifications.

The knowledge maps were also received in their near-final form by the project team and by groups of nursing and midwifery tutors. Nevertheless their provisional nature is stressed. The samples were not very large, and we also collected some evidence of variation with context.

2 Case studies of the mediation of scientific knowledge into professional practice during pre-registration programmes

Three substantial case studies are reported in Chapter 3, sections 3.3, 3.4 and 3.5.

Case Study 1: An integrated midwifery programme with no shared learning and very close links with practice settings. It also has links with higher education but is located on a hospital site.

Case Study 2: A university-based midwifery programme with some shared learning with P2000 nursing students and links with three more distant practice areas.

Case Study 3: A large university-based DipHE nursing programme with teaching on both university and hospital sites. CFP, Adult Branch and Mental Health Branch were studied.

The methods used are summarised in Figure A1 below. However, as the case studies involved observation and interviewing over several months, a great deal of information was gathered informally and most of the evidence collected was cross-checked with other sources.

Source of Evidence	Case Study 1	Case Study 2	Case Study 3
Observations of teaching	36 hrs	20 hrs	71 hrs
Observation of students' clinical practice	20 hrs	–	16 hrs
Students interviewed	20	27	28
Teachers interviewed	10	5	18
Mentors interviewed	6	–	2
Scenario exercise with students	2	1	–
Course documents	✓	✓	✓
Teaching materials	✓	✓	✓
Student essays	✓	–	–
Examination papers	✓	–	✓

Figure A1: Research methods used in the case studies

This was not so true of the four Mini Studies which were much shorter and exclusively focused on the mediation and use of biological knowledge.

Mini Study 1: An innovative life science teaching programme on a DipHE nursing programme different from that in Case Study 3.

Mini Study 2: The use of biological knowledge by DipHE nursing students working on an adult surgical ward.

Mini Study 3: The CFP life sciences programme on a third Dip HE nursing programme.

Mini Study 4: The use of biological knowledge about respiration by recently qualified and more experienced nurses working with breathless patients in hospital settings.

The evidence collected from these studies, reported in Chapter 3, section 3.6 is summarised in Figure A2 below.

Source of evidence	Mini Study 1	Mini Study 2	Mini Study 3	Mini Study 4
Observation of teaching	18 hrs	–	–	–
Observation of students' clinical practice	–	18 hrs	–	–
Students interviewed	–	6	28	–
Teachers interviewed	6	–	7	–
Practitioners interviewed	–	–	–	11
Curriculum documents	✓	–	✓	–
Student questionnaires	–	–	30	–

Figure A2: Research methods used in the mini studies

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